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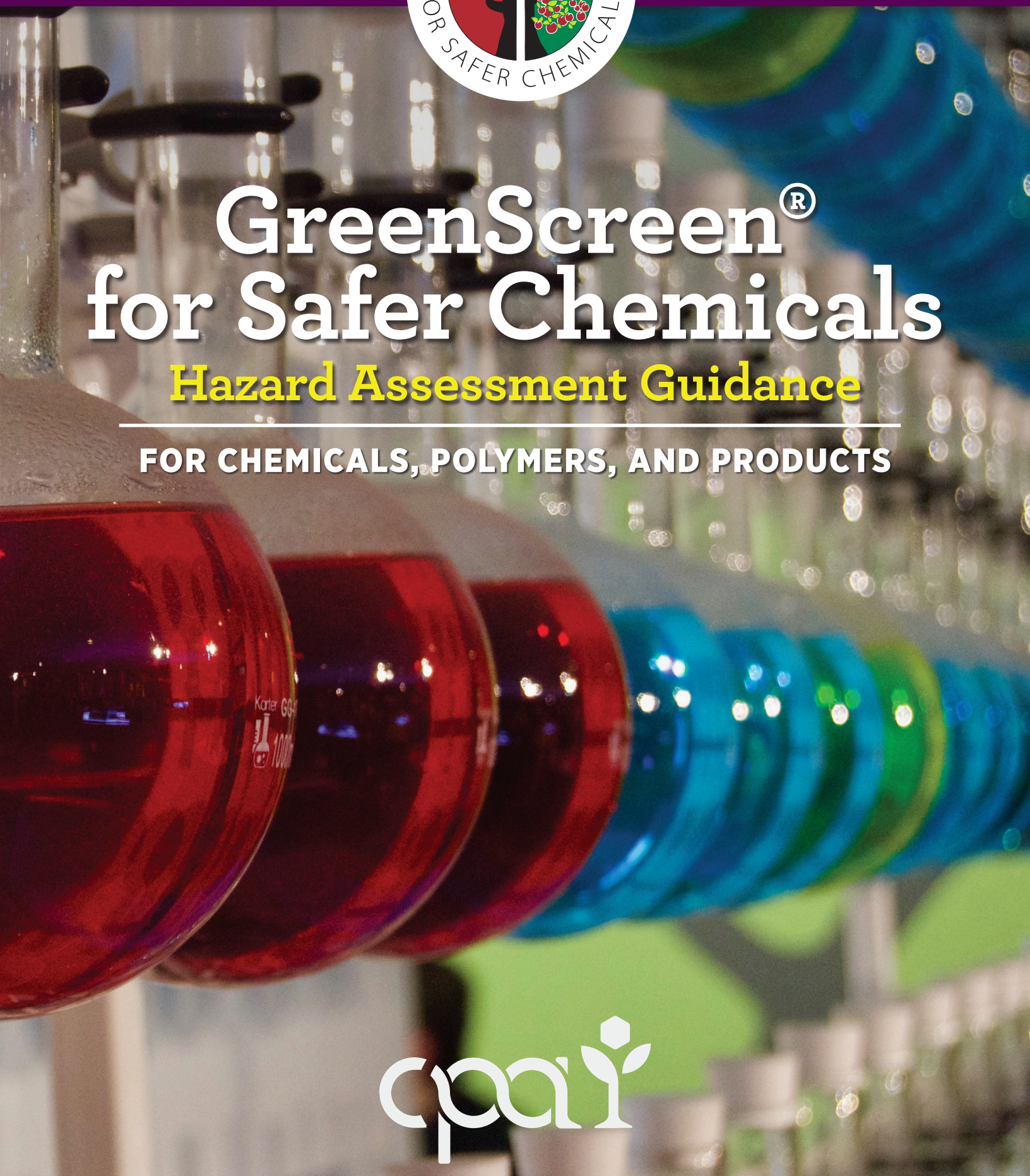

GreenScreen® for Safer Chemicals

Hazard Assessment Guidance

FOR CHEMICALS, POLYMERS, AND PRODUCTS

GreenScreen® for Safer Chemicals Hazard Assessment Guidance

VERSION 1.5a • APRIL 2026

Clean Production Action designs and delivers strategic solutions for green chemicals, sustainable materials, and environmentally preferable products.

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Acknowledgments

Clean Production Action is committed to maintaining clear and transparent guidance for producing comprehensive GreenScreen assessments and accurate Benchmark scores. Due to the increasingly widespread implementation of GreenScreen for Safer Chemicals, guidance revisions are conducted on a regular basis to uphold the method's scientific rigor and alignment with other global programs. This is accomplished through in-depth technical discussions with GreenScreen advisory groups, who provide valuable feedback and recommendations for improving the guidance resources. We would like to extend distinguished acknowledgment to the scientists and industry professionals who have donated significant time and expertise toward the development and continued upkeep of GreenScreen for Safer Chemicals.

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In producing the final guidance resources we thank Ellen Goldberg, Operations Manager, Clean Production Action for her detailed editorial review and David Gerratt of DG Communications for his creativity in design. In the end we as key contributors take responsibility for any flaws or errors contained herein.

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Summary of Revisions

What changed in v1.5a

ADDITION OF TWO NEW CLIMATE IMPACT HAZARD ENDPOINTS

For the April 2026 v1.5a update, GreenScreen® for Safer Chemicals has formally added climate impact endpoints, specifically ozone-depleting potential (ODP) and global warming potential (GWP), into the methodology as informational (FYI) criteria:

- These endpoints are included in the method and can be reported by profilers as part of assessments (see Transition Policy below).
- Until further notice, ODP and GWP do not affect GreenScreen benchmark scores (i.e., Climate Impact endpoints do not change the hazard-based benchmark criteria).

The net effect of this change is that climate impact data are now tracked and visible in GreenScreen assessments, but benchmark scoring remains governed by the system's chemical hazard criteria. This approach is consistent with the existing hazard-based intent of GreenScreen. In v1.5a, the core methodology, benchmark criteria, and scoring logic remain identical to v1.4. Therefore, the v1.5a updates support climate impact transparency while maintaining full backward compatibility for existing assessments.

This update is being implemented as part of a broader v1.5 update, which will include other changes to be released in 2026. These additional updates will include their own relevant criteria and associated transition timelines.

External links and references have been added to information tables in this version to support the addition of the two new Climate Impact endpoints.

Transition Policy for Greenscreen v1.5a

This transition policy applies to all GreenScreen® assessments conducted by Licensed GreenScreen Profilers during the rollout of Version 1.5a.

1. **Transition Period and Acceptable Method Versions**
   a. **Transition period** — From the effective date of Method v1.5a through December 31, 2026, profilers may use either v1.4 or v1.5a for new, renewed, or revised GreenScreen assessments unless otherwise stated in specific programs (e.g., GreenScreen Certified).
   b. **Mandatory adoption date** — Beginning January 1, 2027, all new, renewed, or revised GreenScreen assessments must use v1.5a.
2. **Scoring of Climate Impact Endpoints**
   a. **Non-scoring status** – Under v1.5a, until further notice, Climate Impact endpoints (ODP and GWP) are to be reported as informational ("FYI") and shall not affect GreenScreen benchmark scores.
   b. **Documentation requirements** – When using v1.5a, Profilers must:
      - Document whether ODP/GWP information was identified, and
      - Cite the regulatory lists and sources used to characterize climate impact, where applicable.
3. **Existing GreenScreen Assessments**
   a. **Existing v1.4 GreenScreen assessments** — GreenScreen assessments completed under v1.4 remain valid for their specified duration period.
   b. **Optional early migration to v1.5a** — Prior to December 31, 2026, Licensed GreenScreen Profilers may choose to update existing assessments to v1.5a during the transition period. Any such updates must clearly state that v1.5a was used.

Preface

Clean Production Action developed GreenScreen® for Safer Chemicals (GreenScreen) as a publicly available and transparent chemical hazard assessment method to help move our society quickly and effectively toward the use of greener and safer chemicals. It is used by a wide range of professionals, governmental bodies, non-profits, businesses, formulators, and product developers—anybody interested in assessing the inherent hazards of chemicals and their potential effect on human health and the environment.

GreenScreen builds on the U.S. Environmental Protection Agency's Design for Environment (DfE) approach and other national and international precedents including but not limited to the Organisation for Economic Cooperation and Development (OECD), Canada Domestic Substances List Methodology, the International Joint Commission, the European Union's Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and Classification, Labeling and Packaging (CLP) Regulations, the Stockholm Convention on Persistent Organic Pollutants and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). It is freely and publicly accessible, transparent, and peer-reviewed.

The guidance provided in this publication clearly outlines every step for performing GreenScreen assessments, including how to assess and classify hazards, derive GreenScreen Benchmark™ scores and GreenScreen List Translator™ scores, and make informed decisions. In this latest version, the method for assessing polymers was extensively updated to address the complexities involved in their hazard evaluation. In addition, further clarification was provided for performing GreenScreen assessments of products.

Regulatory requirements and toxicology continue to evolve rapidly, and new hazard classifications, test data and science continue to emerge. This procedure will be regularly revised and updated, particularly as new versions of important foundational pieces, such as the GHS, are released.

Overview

1. INTRODUCTION

GreenScreen for Safer Chemicals® ("GreenScreen") is a chemical hazard assessment methodology. Since chemicals are the core of our materials economy and the building blocks of products, GreenScreen can be applied at every level of complexity and any stage along the supply chain. GreenScreen can also be used to assess hazards of chemicals used in manufacturing facilities or workplaces.

GreenScreen List Translator™ is a streamlined chemical hazard assessment methodology based on review of GreenScreen Specified Lists™ only, and can be very informative as a preliminary step to quickly identify known chemicals of high concern and to prioritize chemicals for further review or action.

This guidance document includes requirements for Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners™. This document is also intended to serve as guidance for users seeking to generate comprehensive and high quality GreenScreen assessments.

Section I describes how to assess a single chemical using GreenScreen.

Section II describes how to assess a polymer using GreenScreen.

Section III provides guidance for assessing a product using GreenScreen and/or GreenScreen List Translator™. Products are identified by manufacturer and trade name and can include chemical substances, chemical mixtures, polymeric materials, homogeneous materials, or articles.

Section IV describes how to assess a chemical using GreenScreen List Translator.

Section V contains all the Annexes referenced in prior sections.

Section VI includes access to the GreenScreen Assessment Templates.

2. NORMATIVE REFERENCES

2.1 Familiarity with the documents listed below is part of the competency requirements for Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners.

2.1.1 Globally Harmonized System of Classification and Labelling of Chemicals (GHS), United Nations, New York and Geneva,[1] and

2.1.2 U.S. Environmental Protection Agency, Office of Pollution Prevention & Toxics, Safer Choice Master Criteria for Safer Chemical Ingredients.[2]

2.2 Use the most recent edition of each normative reference when conducting a GreenScreen assessment, unless otherwise specified in the Guidance.

1 http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html (accessed 9/20/17)

2 https://www.epa.gov/saferchoice/safer-choice-master-criteria-safer-chemical-ingredients (accessed 9/20/17)

3. GENERAL REQUIREMENTS

3.1 To ensure clarity regarding GreenScreen versions used and the extent to which assessments are current:

3.1.1 The version number of GreenScreen documentation used for an assessment must always be identified in the assessment report along with the date of the assessment; and

3.1.2 Results cannot be directly compared between different versions where changes are categorized as major according to the GreenScreen Version Control Policy. To compare assessments between 1.0 and 2.0 level changes, the older assessment must be revised to meet the criteria of the most recent version.

3.2 GreenScreen assessments must be updated at the frequency defined in the GreenScreen Terms of Use.

3.3 Adhere to the GreenScreen Terms of Use.[3]

4. GENERAL REPORTING REQUIREMENTS

Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners must use the most recent version of the GreenScreen Assessment Template or equivalent for the chemical, polymer, or product being assessed (See Templates 1 through 5 in Section VI), and be transparent in presenting assessment results, clearly communicating both data quality and data completeness. All assessment report templates must adhere to the following general guidelines:

4.1 The hazard classification summary provided for each GreenScreen hazard endpoint must include a summary of the toxicity data, discussion of use of data from suitable analogs or model results, and the rationale for the selected hazard level and confidence level;

4.2 The report must include a discussion of which environmental transformation products were considered and supporting rationale for why they were or were not considered feasible and/or relevant;

4.3 Benchmark scores that have been modified due to data gaps, environmental transformation products or chemicals of high concern must be presented with relevant subscripts (e.g., Benchmark-2_{DG}, Benchmark-1_{TP}, or Benchmark-1_{CoHC}); and

4.4 Where there are data gaps, include a worst-case scenario estimate to indicate what the lowest possible Benchmark score would be if the data gap were filled with the highest possible hazard level, unless expert judgment is deemed sufficiently strong to rule out certain hazards.

5. MAKING INFORMED DECISIONS

5.1 GreenScreen is intended for use as one tool in the sustainability toolbox. It is a method for comparative chemical hazard assessment and is not intended to address impacts from energy consumption, resource extraction, etc. that are typically addressed in life cycle assessment.

5.2 GreenScreen helps to inform decision making for the design and development of products and processes, for material or product procurement, and to support and enhance environmental management systems, environmental health and safety (EHS) programs, and global sustainability or environmental reporting. GreenScreen provides a clear and transparent format for presenting what is known and what is not known about the hazards associated with chemicals.

3 https://www.greenscreenchemicals.org/about/greenscreen-terms-of-use (accessed 9/20/17)

5.3 Chemicals may achieve the same Benchmark score but have very different hazard profiles. Therefore, GreenScreen Benchmark scores should be used in combination with the Hazard Summary Table™ and the GreenScreen assessment report. The GreenScreen assessment report includes information on transformation products and data quality and completeness, information that can assist in making an informed choice and avoiding a regrettable substitution.

5.4 One of the strengths of the GreenScreen methodology is its clear identification of data gaps regarding chemical hazards and a transparent distinction between low hazard and unknown hazard. Data gaps should always be considered in the context of how the lack of information relates to exposure through the entire life cycle (e.g., workers, users, end users, and the environment).

5.5 When making informed decisions based on assessment results, the acceptability of data gaps should be considered on a case-by-case basis depending on known chemical or product use or exposure scenarios. For example, while lack of data on Skin Irritation may be sufficient to achieve a Benchmark-3 for a chemical, it is not an acceptable data gap when selecting a chemical for use in a skin lotion. Similarly, if there is a data gap for Systemic Toxicity via the inhalation exposure route for a perfume additive, an informed decision cannot be made about the safety of this chemical for workers at the factory or consumers.

5.6 The GreenScreen reporting frameworks for chemicals, polymers, and products, provide maximum transparency to decision-makers. Using GreenScreen, organizations may integrate their own policies and priorities with GreenScreen assessment results to guide informed choices. These choices may be in product design, manufacturing, product specifications, or purchasing. For example, an organization may set a sustainability goal to eliminate all Benchmark-1 chemicals regardless of concentration. Another organization may set the goal to reduce the mass or weight percent of Benchmark-1 chemicals used. A third organization may set a goal to increase the mass or weight percent of Benchmark-3 and Benchmark-4 chemicals. These goals can be scoped at the product, product group, process, facility, or company level.

6. RECORDS

Licensed GreenScreen Profilers and Authorized GreenScreen Practitioners must keep all documents generated as a result of the implementation of this Guidance on file for the duration of the Licensing period and five years thereafter.

7. TERMS AND DEFINITIONS

TERM	DEFINITION
100 ppm	One hundred parts per million (ppm) is equivalent to 0.01% by weight.
1,000 ppm	One thousand parts per million (ppm) is equivalent to 0.1% by weight.
Acute Aquatic Toxicity (AA)	"The intrinsic property of a substance to be injurious to an organism in a short-term, aquatic exposure to that substance." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Acute Mammalian Toxicity (AT)	"The adverse effects occurring following oral or dermal administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Additivity	An approach for hazard classification when data are available on the ingredients, but not on the mixture as a whole. The theory of additivity assumes each ingredient contributes to the overall toxicity of the mixture in proportion to its potency and concentration. However, this additivity principle does not apply to non-additive hazard classes. (Adapted from GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Analog	See Suitable Analog.
Article	"An object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition." (REACH Article 3(3); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Assessment Report Template	A report template used to document all findings gathered during a GreenScreen assessment.
Authoritative Secondary Sources	A compilation of research studies that have been reviewed and analyzed by a group that is not the author of the original study(ies) but that is a group of recognized authorities such as health profession organizations, accredited institutions and universities, and governmental entities.
Authoritative Toxicology Databases	Database information that is reviewed, approved, and regularly updated by a group of recognized authorities such as health profession organizations, accredited institutions and universities, and governmental entities.
Authorized GreenScreen Practitioner™	An individual who has completed advanced GreenScreen training, has demonstrated scientific expertise and capacity to perform high quality GreenScreen assessments, and is licensed by Clean Production Action to conduct GreenScreen assessments for his or her registered organization.
Bioaccumulation (B)	"A process in which a chemical substance is absorbed in an organism by all routes of exposure as occurs in the natural environment (e.g., dietary and ambient environment sources). Bioaccumulation is the net result of competing processes of chemical uptake into the organism at the respiratory surface and from the diet and chemical elimination from the organism including respiratory exchange, fecal egestion, metabolic biotransformation of the parent compound and growth dilution." (Arnot, J.A. and F.A. Gobas, A review of bioconcentration factor (BCF) and bioaccumulation factor (BAF) assessments for organic chemicals in aquatic organisms. Environmental Reviews, 2006. 14: p. 257–297; http://www.nrcresearchpress.com/doi/abs/10.1139/a06-005, accessed 9/20/17)

TERM	DEFINITION
Bioavailability	"The rate and extent to which a substance can be taken up by an organism and is available for metabolism or interaction with biologically significant receptors. Bioavailability (biological availability) involves both release from a medium (if present) and absorption by an organism." (CLP; https://echa.europa.eu/documents/10162/23036412/clp_en.pdf/58b5dc6d-ac2a-4910-9702-e9e1f5051cc5, accessed 9/20/17)
Carcinogenicity (C)	"Capable of increasing the incidence of malignant neoplasms, reducing their latency, or increasing their severity or multiplicity." (IARC; http://monographs.iarc.fr/ENG/Preamble/currenta2objective0706.php, accessed 9/20/17)
CASRN	Chemical Abstracts Service Registry Number (also known as "CAS#").
Catalyst	Chemical compound or substance that causes or accelerates a chemical reaction without itself being affected.
Chemical	See Chemical Compound.
Chemical Compound	A molecule (or molecular entity) composed of atoms of more than one element held together by chemical bonds and typically identified by CASRN. Synonyms used in this guidance include "chemical" or "compound."
Chemical Substance "Substance"	"A chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition." (REACH Article 3(1); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17) For the purposes of this guidance, a chemical substance is comprised of constituents (i.e., chemical compounds and/or chemical elements), and a chemical substance can be a component within a mixture.
Chronic Aquatic Toxicity (CA)	"The intrinsic property of a substance to cause adverse effects to aquatic organisms during aquatic exposures that are determined in relation to the life-cycle of the organism." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Climate Impact	Adverse effects on the Earth's climate as measured by Ozone Depletion Potential (ODP) and/or Global Warming Potential (GWP).
Component	"Substance intentionally added to form a mixture." (https://echa-term.echa.europa.eu/; accessed 10/11/17)
Constituent	"Any single species present in a substance that can be characterised by its unique chemical identity." (https://echa-term.echa.europa.eu/; accessed 10/11/17)
Dalton (Da)	"Precisely 1.0000 atomic mass unit or 1/12 the mass of a carbon atom of mass 12. Hence, a polymer with a molecular weight of 10,000 atomic mass units has a mass of 10,000 daltons." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)
Data Gap (DG)	GreenScreen nomenclature that indicates that measured data and authoritative and screening lists have been reviewed, and expert judgment and estimation such as modeling and analog data have been applied, and there is still insufficient information to assign a hazard level to an endpoint for a GreenScreen assessment.

4 For complete details on GreenScreen method see http://www.greenscreenchemicals.org/method/method-documents.

5 See http://www.greenscreenchemicals.org/method/method-documents.

TERM	DEFINITION
Developmental Toxicity (D)	"Adverse effects in the developing organism that may result from exposure prior to conception (either parent), during prenatal development, or postnatally to the time of sexual maturation. Adverse developmental effects may be detected at any point in the lifespan of the organism. The major manifestations of developmental toxicity include: (1) death of the developing organism, (2) structural abnormality, (3) altered growth, and (4) functional deficiency." (USEPA, Guidelines for Developmental Toxicity Risk Assessment. Federal Register, 1991. 56(234): p. 63798–63826; https://ntp.niehs.nih.gov/iccvam/SuppDocs/FedDocs/EPA/EPA-devtox.pdf, accessed 9/20/17)
Endocrine Activity (E) (Endocrine Active Substance)	"An endocrine active substance is a substance having the inherent ability to interact or interfere with one or more components of the endocrine system resulting in a biological effect, but need not necessarily cause adverse effects. Endocrine activity is considered as a collection of modes of action, potentially leading to adverse outcomes, rather than a (eco)toxicological hazard in itself." (EFSA; http://www.efsa.europa.eu/en/efsajournal/pub/3132.htm, accessed 9/20/17)
Endocrine Disruption (Endocrine Disruptor)	"An exogenous substance or mixture that alters function(s) of the endocrine system and consequently causes adverse health effects in an intact organism, or its progeny, or (sub)populations." (European Commission; http://ec.europa.eu/environment/chemicals/endocrine/definitions/endodis_en.htm, accessed 9/20/17)
Eye Irritation (IrE)	"The production of changes in the eye following the application of a test substance to the anterior surface of the eye, which are fully reversible within 21 days of application." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Feasible Environmental Transformation Product (TP)	An environmental transformation product that is likely to form/occur because the chemical structure of the parent chemical allows for certain types of transformations (e.g., hydrolysis) and because those transformations are likely to occur based on the functional use of the chemical across its life cycle (e.g., discharged to water).
Functional Additive	A chemical compound, chemical substance, or mixture of chemical substances intentionally added to impart a desired characteristic to a product or serve a particular function in the product (e.g., stabilizer, colorant, plasticizer). Functional additives can be polymeric or non-polymeric in nature.
Gas	"A substance which (i) at 50°C has a vapor pressure greater than 300 kPa (absolute); or (ii) is completely gaseous at 20°C at a standard pressure of 101.3 kPa." (GHS Rev 10; https://unece.org/transport/dangerous-goods/ghs-rev10-2023, accessed 12/17/25)
GHS	Globally Harmonized System of Classification and Labelling of Chemicals.
Global Warming Potential (GWP); GWP-100	"A measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period." (US EPA; https://www.epa.gov/ghgemissions/understanding-global-warming-potentials, accessed 12/17/25). The GWP is a common unit of measure and facilitates comparison of global warming impacts of different gases. A high GWP correlates with a large infrared absorption and a long atmospheric lifetime.
GreenScreen Assessment	A comprehensive chemical hazard assessment that results in one GreenScreen Benchmark score (e.g., Benchmark-1, -2, -3, -4, or -U).
GreenScreen Benchmark™ Criteria	A set of algorithms or decision logic used to assign a GreenScreen Benchmark score to a chemical compound or polymer based on the hazard profile. The Benchmark criteria include a combination or combinations of GreenScreen Hazard Endpoints and hazard levels.

TERM	DEFINITION
GreenScreen Hazard Endpoint	A specific type of adverse health, environmental toxicity and fate outcome, physical property, or climatic impact that can cause harm. GreenScreen guidance specifies 20 Hazard Endpoints that must be evaluated and are listed in Annex 2. Examples include: Carcinogenicity, Acute Aquatic Toxicity, Bioaccumulation, and Flammability.
GreenScreen Hazard Summary Table™	The table in a GreenScreen Assessment Report Template used to document and present the hazard levels for all 20 Hazard Endpoints. Templates are provided in Section VI of this document.
GreenScreen List Translator™ (LT)	A streamlined chemical hazard assessment method developed by Clean Production Action that produces a GreenScreen List Translator score.
GreenScreen List Translator (LT) scores	Scores based on screening chemical compounds against GreenScreen Specified Lists (Annex 11) using GreenScreen List Translator guidance (see Section IV). Possible scores include LT-1, LT-P1, LT-UNK and NoGSLT.
GreenScreen Specified Lists™	Lists generated by state, national, or international governments, authoritative bodies, and expert organizations. These lists are required to be searched for a GreenScreen assessment. GreenScreen List Translator relies on these lists to generate a List Translator score.
Homogeneous Material	"One material of uniform composition throughout or a material, consisting of a combination of materials, that cannot be disjointed or separated into different materials by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes." (EU Directive 2008/98/EC; http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0065&from=EN, accessed 10/26/17)
Impurity	"An unintended constituent present in a substance as manufactured. It may, for example, originate from the starting materials or be the result of secondary or incomplete reactions during the production process. While it is present in the final substance, it was not intentionally added. In most cases impurities constitute less than 10% of the substance." (ECHA; https://echa-term.echa.europa.eu, accessed 10/11/17)
Intentionally Added Substance	See Functional Additive.
Licensed GreenScreen Profiler	An organization with expertise in toxicology and comparative chemical hazard assessment that is licensed by Clean Production Action to provide GreenScreen assessments for a fee for clients. (https://www.greenscreenchemicals.org/professionals/profilers)
Monomer	"A substance which is capable of forming covalent bonds with a sequence of additional like or unlike molecules under the conditions of the relevant polymer-forming reaction used for the particular process." (REACH Article 3(6); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Mutagenicity & Genotoxicity (M)	"The more general terms genotoxic and genotoxicity apply to agents or processes which alter the structure, information content, or segregation of DNA, including those which cause DNA damage by interfering with normal replication." (USEPA; https://www.epa.gov/sites/production/files/2014-01/documents/aa_criteria_v2.pdf, accessed 9/20/17)
Neurotoxicity (N)	"An adverse change in the structure or function of the central and/or peripheral nervous system following exposure to a chemical, or a physical or biological agent." (USEPA, Guidelines for Neurotoxicity Risk Assessment. Federal Register, 1998. 63(93): p. 26926–26954; https://www.epa.gov/sites/production/files/2014-11/documents/neuro_tox.pdf, accessed 9/20/17)
Number Average Molecular Weight (Mn)	"The arithmetic average (mean) of the molecular weights of all molecules in a polymer. (This value should not take into account unreacted monomers and other reactants, but must include oligomers.)." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)

TERM	DEFINITION
Oligomer	A molecule of intermediate relative molecular mass, the structure of which essentially comprises a small plurality of units derived, actually or conceptually, from molecules of lower relative molecular mass. (IUPAC)
Ozone Depleting Potential (ODP)	"A number that refers to the amount of ozone depletion caused by a substance. The ODP is the ratio of the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11." (US EPA; https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances, accessed 12/17/25).
Ozone Depleting Substances (ODS)	"Substances known to deplete the stratospheric ozone layer. The ODS controlled under the Montreal Protocol and its Amendments are chlorofluorocarbons (CFC), hydrochlorofluorocarbons (HCFC), halons, methyl bromide (CH3Br), carbon tetrachloride (CCl4), methyl chloroform (CH3CCl3), hydrobromofluorocarbons (HBFC) and bromochloromethane (CHBrCl)." (California Air Resources Board; https://ww3.arb.ca.gov/cc/capandtrade/protocols/ods/ods.htm, accessed 3/28/21.)
Parent chemical	For the purposes of this guidance, a parent chemical is the chemical of interest that is being assessed.
Persistence (P)	"The length of time the chemical can exist in the environment before being destroyed (i.e., transformed) by natural processes." (USEPA, https://www.epa.gov/sites/production/files/2014-01/documents/aa_criteria_v2.pdf, accessed 9/20/17)
Polymer Species	"Molecules characterized by the sequence of one or more types of monomer units. Such molecules must be distributed over a range of molecular weights wherein differences in the molecular weight are primarily attributable to differences in the number of monomer units. Polymer species comprise the following: (a) a simple weight majority (i.e., 50%) of molecules containing at least three monomer units which are covalently bound to at least one other monomer unit or other reactant; or (b) less than a simple weight majority of molecules of the same molecular weight." In the context of this definition a "monomer unit" means the reacted form of a monomer in a polymer." (REACH, Article 3(5); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 10/14/17)
Polymeric Material	A mixture of one or more polymer substance(s) or polymer mixture(s), all other functional additives (i.e., intentionally added substances), and unintentional impurities.
Polymeric Material Impurities	Impurities imparted to the polymeric material from a source other than the intentionally added components.
Polymer Mixture	A mixture comprised of a polymer substance and unreacted monomer(s).
Polymer Substance	A substance comprised of constituents: polymer species, additives necessary to preserve stability, and impurities deriving from the manufacturing process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition. (based on REACH Article 3(1); http://www.reachonline.eu/REACH/EN/REACH_EN/article3.html, accessed 9/20/17)
Processing Aid	A product that is used to provide a technical effect in processing but no technical or functional effect in the product and may remain in small amounts in finished product (e.g., lubricants, mold release agents).
Product	A chemical substance, chemical mixture, polymeric material, homogeneous material, or article identified by a manufacturer and trade name.
Reactive Functional Group (RFG)	"An atom or associated group of atoms in a chemical substance that is intended or can be reasonably anticipated to undergo facile chemical reaction." (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 9/20/17)

TERM	DEFINITION
Relevant Environmental Transformation Product	An environmental transformation product that is: 1) persistent enough to be encountered after use or release of the parent chemical and 2) NOT a substance necessary for life or commonly formed in the ambient environment.
Reproductive Toxicity (R)	"The occurrence of biologically adverse effects on the reproductive systems of females or males that may result from exposure to environmental agents. The toxicity may be expressed as alterations to the female or male reproductive organs, the related endocrine system, or pregnancy outcomes. The manifestation of such toxicity may include, but is not limited to, adverse effects on onset of puberty, gamete production and transport, reproductive cycle normality, sexual behavior, fertility, gestation, parturition, lactation, developmental toxicity, premature reproductive senescence, or modifications in other functions that are dependent on the integrity of the reproductive systems." (USEPA, Guidelines for Reproductive Toxicity Risk Assessment. Federal Register, 1996. 61(212): p. 56274-56322; https://www.epa.gov/sites/production/files/2014-11/documents/guidelines_repro_toxicity.pdf, accessed 9/20/17)
Residual Monomer	An unintended impurity in a polymer substance.
Respiratory Sensitization (SnR)	"Hypersensitivity of the airways following inhalation of a substance or mixture." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Skin Irritation (IrS)	"The production of reversible damage to the skin following the application of a test substance or mixture for up to four hours." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Skin Sensitization (SnS)	"A skin sensitizer is a substance that will lead to an allergic response following skin contact." (GHS Rev 7; https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 9/20/17)
Special Case Impurity	Chemicals of high concern typically found in a product and identified based on life cycle knowledge, particularly of feedstock or upstream manufacturing processes.
Stabilizer	A chemical or substance that is used to prevent degradation. Biocides and preservatives are not stabilizers, but rather considered as other types of functional additives.
Strength of Evidence	A qualitative evaluation that considers the results of a clinical trial or research study. The strength of the evidence will take into consideration how well a study was designed, conducted, and analyzed, and evaluate the overall strength of that body of evidence.
Substance Impurity	An impurity of a chemical substance or polymer substance, such as a residual catalyst. See also "Impurity."
Suitable Analog	A chemical that can be used to estimate the hazard of the chemical of interest when data on the chemical of interest are not available. A suitable analog is chemically (e.g., based on chemical structure) and/or biologically (e.g., based on metabolic breakdown, or likely mechanistic/mode of action considerations) similar to the chemical of interest. Guidance for identifying a suitable analog can be found in OECD Series on Testing and Assessment No. 80 Guidance on Grouping of Chemicals. The suitable analog used must be appropriate for the attribute being evaluated. (based on OECD; http://www.oecd.org/chemicalsafety/testing/series-testing-assessment-publications-number.htm, accessed 9/20/17)
Systemic Toxicity & Organ Effects (including Immunotoxicity) (ST)	Includes all significant non-lethal effects in a single organ that can impair function, both reversible and irreversible, immediate and/or delayed, not otherwise covered by any other endpoint; or generalized changes of a less severe nature involving several organs.

TERM	DEFINITION
Thermoplastic Polymer	Polymers that soften when heated and can be remolded. (http://ec.europa.eu/environment/chemicals/reach/pdf/studies_review2012/annexe1_study10.pdf, accessed 9/20/17)
Thermoset Polymer	Cross-linked polymers. They do not readily soften and cannot be remolded. (http://ec.europa.eu/environment/chemicals/reach/pdf/studies_review2012/annexe1_study10.pdf, accessed 9/20/17)
Transient Transformation Products	A transformation product that has a very short half-life and is typically an intermediate along a degradation pathway.
Unreacted Monomer	An intended component in a polymer mixture.
Valid GreenScreen Assessment	A GreenScreen assessment report that is not expired or superseded. See Terms of Use.
Vapor	"Vapor means the gaseous form of a substance or mixture released from its liquid or solid state." (GHS Rev 10; https://unece.org/transport/dangerous-goods/ghs-rev10-2023, accessed 12/17/25).

Section I — Assessing Chemicals

8. PURPOSE

Section I outlines the procedure to perform a GreenScreen assessment of a chemical compound (also referred to as "chemical" or "compound"), either organic or inorganic, including how to assess and classify hazards and assign a GreenScreen Benchmark™ score.

8.1 A GreenScreen assessment of a chemical includes a comprehensive review of all available information including 1) measured data from toxicological studies in the scientific literature, 2) estimated data from suitable analogs and models, and 3) hazard lists.

8.2 GreenScreen Specified Lists™ are the hazard lists required to be searched for a GreenScreen assessment. The GreenScreen Specified Lists are included in the GreenScreen Chemical Hazard Criteria in Annex 1 and the GreenScreen List Translator Map in Annex 12. Licensed GreenScreen List Translator Automators provide tools to search all GreenScreen Specified Lists efficiently.

9. SCOPE

9.1 The procedure below must be used to derive a Benchmark score for a chemical compound. Assessors must apply expert judgment when evaluating appropriateness of available toxicological data for classifying hazards of the chemical compound, including consideration of varying concentrations of impurities in experimental test substances.

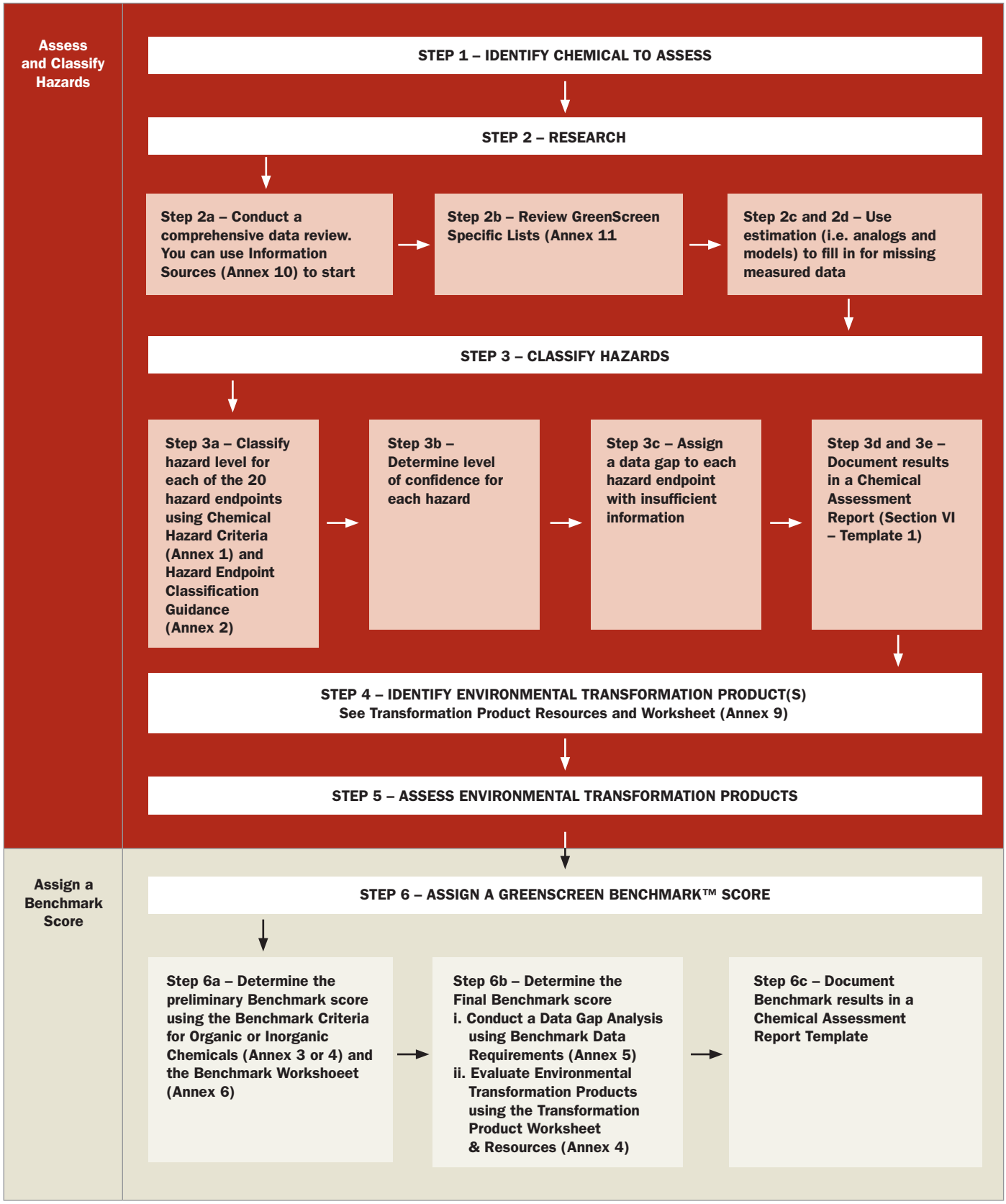
9.3 See Section II for polymers.

9.3 See Section III for products.

10. PROCESS OVERVIEW

The following figure illustrates the relationship between GreenScreen resources in the Annexes and the various steps performed in conducting a GreenScreen assessment of a chemical. The order of steps may vary based on individual preference.

FIGURE 1. **GreenScreen Chemical Assessment Procedure**



11. ORGANIC CHEMICAL ASSESSMENT PROCEDURE

This sub-section 11 describes the assessment and classification procedure for an organic chemical. This sub-section 11 in combination with sub-section 12 describes the chemical assessment and classification procedure for an inorganic chemical.

11.1 Step 1 – Identify Chemical to Assess

Determine the chemical compound to be evaluated and report the chemical abstract service number (CASRN) and chemical structure.

If a GreenScreen assessment specific to a particular manufacturer and trade name is desired, then the assessor must follow the procedure outlined in Section III for a chemical substance.

11.2 Step 2 – Research

Assessing chemicals is accomplished by examining comprehensive toxicological data, checking GreenScreen Specified Lists, and using estimated data from suitable analogs or modeled data where measured data are lacking for the parent chemical. A "strength of evidence" approach may be used and the rationale behind the hazard classification should be clearly stated, particularly in the case where multiple studies are available that measure the same hazard endpoint. The order of steps may vary based on individual preference (e.g., reviewing Specified Lists prior to conducting a toxicological review).

11.2.1 Step 2a – Conduct a comprehensive data review

Review all available measured data from standardized tests and scientific literature:

1) Primary literature sources, authoritative secondary sources that are peer reviewed, and authoritative sources are preferred. Examples of peer reviewed authoritative secondary sources include IARC Monographs, government risk assessments, and authoritative toxicology databases.
2) Other high quality secondary sources are acceptable.
    a. If a study is cited from a secondary source, it must be referenced as a secondary source.
    b. Publicly available primary data for Flammability and Reactivity may not be available. Secondary sources such as Safety Data Sheets (SDS) may be used for Flammability and Reactivity when there are no other options.

11.2.2 Step 2b – Review all GreenScreen Specified List

1) When conducting GreenScreen assessments, it is mandatory to search all GreenScreen Specified Lists and report the results. Third parties have developed automated software to assist with searching; see Section IV for comprehensive guidance on performing a GreenScreen List Translator assessment.
2) To classify hazards, use the information contained within the GreenScreen Specified Lists in combination with the literature review and expert judgment.
3) See Section IV for a description of how GreenScreen Specified Lists are categorized (i.e., Authoritative A or B, and Screening A or B).

11.2.3 Step 2c – Use measured data from suitable analog(s) to fill missing dat

1) Provide information on whether and why a suitable analog(s) was used to evaluate one or more hazard endpoints that were missing measured data. If a suitable analog(s) was not used, include rationale in the final report for not using one or more of the

analogs identified. A suitable analog is a chemical that shares similarities in structure, function and mechanism of action with the chemical being assessed. In some cases, the analog may be a metabolite or transformation product. Examples of resources to identify analogs and guidance for using analogs are provided in number 3 (a-g) below.

2) For each suitable analog used, provide the name and chemical structure, the applicable hazard endpoint(s), and the rationale for why it is considered suitable for each of the hazard endpoint(s). Suitable analog selection is hazard endpoint/parameter dependent, and the choice can be different for different endpoints.

3) Profilers and Practitioners must make a good faith effort to review at least one readily available suitable analog for each hazard endpoint missing data for the parent chemical and consult at least one of the following publicly accessible tools. While beyond the minimum requirements, additional suitable analog identification and assessment may be performed and may add to the quality of the assessment.

   a) Analog Identification Methodology (AIM) (https://www.epa.gov/tsca-screening-tools/analog-identification-methodology-aim-tool, accessed 9/18/17);

   b) ChemIDplus database (https://chem.nlm.nih.gov/chemidplus, accessed 9/18/17);

   c) REACH dossiers (Registration, Evaluation Authorisation and Restriction of Chemicals) (http://echa.europa.eu/web/guest/information-on-chemicals/registered-substances, accessed 9/18/17);

   d) High Production Volume Information System (HPVIS) (https://ofmext.epa.gov/hpvis/HPVISlogon, accessed 9/18/17);

   e) Organisation for Economic Co-operation and Development (OECD) Guidance on the Grouping of Chemicals. Series on Testing and Assessment, Number 80 (http://www.oecd.org/chemicalsafety/testing/series-testing-assessment-publications-number.htm, accessed 9/18/17);

   f) Environmental Protection Agency (EPA) chemical categories (from New Chemicals program) (https://www.epa.gov/reviewing-new-chemicals-under-toxic-substances-control-act-tsca, accessed 9/18/17); and/or

   g) Other risk assessment/risk management regulatory or government documents.

11.2.4 Step 2d – Use estimated data from a model to fill in missing measured dat

At a minimum, use the Sustainable Futures suite of models (1-3 below). These models use quantitative structure activity relationship (QSAR) methods to apply statistical tools correlating biological activity of chemicals with descriptors representative of molecular structure and/or properties.

1) EPISUITE: Software containing physical/chemical property and environmental fate estimation programs. (https://www.epa.gov/tsca-screening-tools/epi-suitetm-estimation-program-interface, accessed 9/18/17);

2) ECOSAR: The Ecological Structure Activity Relationships (ECOSAR) Class Program estimates the acute and chronic aquatic toxicity of industrial chemicals. (https://www.epa.gov/tsca-screening-tools/ecological-structure-activity-relationships-ecosar-predictive-model, accessed 9/18/17); and/or

3) ONCOLOGIC: A computer program that estimates the carcinogenic potential of chemicals. (https://www.epa.gov/tsca-screening-tools/oncologictm-computer-system-evaluate-carcinogenic-potential-chemicals, accessed 9/18/17).

4) While beyond the minimum requirements, additional models may also be useful and enhance the quality of the assessment (e.g., OECD Toolbox at http://www.oecd.org/chemicalsafety/risk-assessment/oecd-qsar-toolbox.htm, accessed 9/18/17).

11.3 Step 3 – Classify Hazards

11.3.1 Step 3a – Classify hazard level for each hazard endpoint

1) The GreenScreen Chemical Hazard Criteria in Annex 1 are used to classify the hazard-level for the parent chemical as High (H), Moderate (M), Low (L) or in some cases very High (vH) or very Low (vL) for each hazard endpoint. Classifications for Data Gaps (DG), unassessed endpoints, or endpoints that are Not Applicable (NA) are also used. The same criteria are used to evaluate any feasible and relevant environmental transformation product(s) as outlined in sub-section 11.4 and 11.5. Figure 2 depicts the GreenScreen Chemical Hazard Criteria for Carcinogenicity, as an example.

2) Evaluate data for *all relevant routes of exposure*. Always consider data for oral, dermal, and inhalation routes of exposures when available. Consider other routes of exposure on a case-by-case basis only (e.g., transplacental transport, lactational transfer, intraperitoneal or subcutaneous injection).

3) In reviews that include conflicting data, use a "strength of evidence" evaluation aimed at the protection of human health and environment to inform the hazard designation. There are a number of resources for reporting strength of evidence (e.g., ECHA Practical Guide 2 – How to report weight of evidence; https://echa.europa.eu/support/registration/how-to-avoid-unnecessary-testing-on-animals/weight-of-evidence, accessed 12/15/17).

4) All data are considered in the assessment, unless there is a very strong scientific rationale to discount a study. Especially with emerging science, there may be disagreement about some studies and/or hazard classifications. Clear and detailed rationale needs to be articulated in the assessment report in order to discount a study.

5) A structural alert can be used as a line of evidence to classify a chemical as Moderate, High, or very High hazard. However, lack of a structural alert alone is not sufficient to classify the chemical as Low hazard. In some cases, sufficient negative data can be used to assign a Low hazard despite the existence of a structural alert. In those cases, the assessment must note the presence of the specific structural alert(s) and provide rationale for assigning a Low hazard in the presence of any structural alert(s).

6) For more in-depth guidance on classifying the hazard level for Reproductive and Developmental Toxicity, Endocrine Activity and Systemic Toxicity, see Annex 2.

FIGURE 2. **GreenScreen Chemical Criteria for Carcinogenicity**

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Carcinogenicity (C)	Data	GHS Criteria & Guidance		GHS Category 1A (Known) or 1B (Presumed) for any route of exposure	GHS Category 2 (Suspected) for any route of exposure or limited or marginal evidence of carcinogenicity in animals	· Adequate data available and negative studies; and · GHS not classified
	A Lists	US EPA – IRIS Carcinogens (1986)	Authoritative	Group A or B1 or B2	Group C	Group E
		US EPA – IRIS Carcinogens (1996, 1999, 2005)	Authoritative	Known or Likely		Not Likely
		EU – REACH Annex XVII CMRs	Authoritative	Category 1 or 2	Category 3	
		EU – Annex VI CMRs	Authoritative	Carc 1A or 1B	Carc 2	
		EU – GHS (H-Statements)	Authoritative	H350 or H350i	H351	
		EU – R-Phrases[1]	Authoritative	R45 or R49	R40	
		EU – SVHC Candidate List	Authoritative	Carcinogenic – Candidate list		
		EU – SVHC Prioritisation List	Authoritative	Carcinogenic – Prioritized for listing		
		EU – SVHC Authorisation List	Authoritative	Carcinogenic – Banned unless Authorised		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A or 1B or H350 or H350i	Category 2 or H351	Not Classified
		GHS – [NEW ZEALAND]	Screening	6.7A	6.7B	Not Classified
		IARC	Authoritative	Group 1 or 2a	Group 2b	Group 4
		MAK	Authoritative	Carcinogen Group 1 or 2	Carcinogen Group 3A or 3B or 4 or 5	
		US CDC – Occupational Carcinogens	Authoritative	Occupational Carcinogen		
		US NIH – Report on Carcinogens	Authoritative	Known or Reasonably Anticipated		
		CA EPA – Prop 65	Authoritative	Carcinogen		
	B Lists	US EPA – IRIS Carcinogens (1986)	Authoritative	Group D		
		US EPA – IRIS Carcinogens (1999)	Authoritative	Suggestive Evidence, but not sufficient to assess human carcinogenic potential		
		US EPA – IRIS Carcinogens (2005)	Authoritative	Suggestive evidence of carcinogenic potential		
		IARC	Authoritative	Group 3		
		CA EPA – Prop 65 (with qualifications)[2]	Authoritative	Carcinogen – specific to chemical form or exposure route		

11.3.2 Step 3b – Determine level of confidence (high or low) for each hazard l vel assigned

Level of confidence is determined by data source(s), data quality, and expert judgment considering the strength of evidence. The rationale behind the assigned level of confidence must be provided for each hazard endpoint.

1) Determine confidence level of each study, listing, or estimation. Measured data, estimated data, and lists may be considered either high confidence or low confidence data sources.
   a. High confidence data sources may include:
      i. Presence on an Authoritative A list;
      ii. High quality measured data for the chemical being assessed;
      iii. High quality measured data for a strong analog.

b. Low confidence data sources may include:

i. Measured data

1. A study with equivocal results (e.g., effect is not significantly different than control when doses are below differentiating GHS criteria levels);
2. A study that is assigned a low reliability using a rating system such as Klimisch scores (e.g., Klimisch scores of 3 or 4);[4]
3. A study that did not follow Good Laboratory Practice (GLP) or a specific test guideline, or evaluated a non-standard effect;
4. A study evaluating a route of exposure other than oral, dermal, or inhalation (e.g., intravenous, intraperitoneal injections). Other routes of exposure may be considered high confidence in specific situations.

ii. Estimated data

1. Measured data for a weak analog;
2. Estimated data from a model on either the parent chemical or a suitable analog.

iii. Lists

1. Presence on an Authoritative B list;
2. Presence on a Screening list.

2) Use a "strength of evidence" approach to assign the confidence level for the hazard classification. Often the body of evidence on a chemical includes multiple studies and/or multiple data types (e.g., lists, measured data, estimated data). Each result is considered in relation to all other results and factors such as data type and data quality. Expert judgment is required.

a. Higher priority data sources are weighed more heavily than lower priority data sources. GreenScreen prioritizes information as follows:

i. Valid measured data on the chemical(s) being evaluated are generally preferred over other types of information, such as hazard lists or estimated values (e.g., suitable analogs or QSAR models).

ii. Authoritative A lists are preferred over Authoritative B or Screening A or B lists. When lists conflict, the most conservative of the authoritative results should be used.

iii. General rules of thumb are as follows:

1. Classify an endpoint as high confidence if the hazard level was determined primarily based on one or more high confidence data sources.
2. Classify an endpoint as low confidence if the hazard level was determined using one or more lower confidence data sources in the absence of high confidence data sources.
3. Classify an endpoint as high confidence when multiple lines of evidence lead to the same conclusion.

4 H.J. Klimisch, M. Andreae, and U. Tillmann. 1997. A Systematic Approach for Evaluating the Quality of Experimental Toxicological and Ecotoxicological Data Regulatory Toxicology and Pharmacology 25:1-5.

4. Classify an endpoint as low confidence when there are multiple studies with mixed results that use comparable methods and are of similar quality.

3) Indicate the level of confidence for each designated hazard level using specified fonts (i.e., **BOLD** versus *ITALICS*).
   a. Hazard levels must be represented in **BOLD** capital letters to signify high confidence (e.g., **H** for High).
   b. Hazard levels must be represented in *ITALIC* capital letters to signify low confidence (e.g., *H* for High).

11.3.3 Step 3c – Assign a data gap (DG) to each hazard endpoint with insufficient info mation

When assessing chemicals, it is ideal to use a complete set of publicly available data covering all hazard endpoints. In reality, most chemicals have insufficient data to assess and classify all of the hazard endpoints.

1) Assign a data gap to any hazard endpoint where there is insufficient information to assess the hazard using measured data on the parent chemical, measured data on a suitable analog, or estimated data on the parent chemical or suitable analog chemical.
2) Assign a data gap only after *all avenues* have been explored to fill missing data, including using measured data, estimated data, and expert judgment. Unless all these sources are explored, a data gap cannot be assigned.
3) Use a "blank" if the endpoint has not been assessed or until all options for filling a data gap have been exhausted.
4) If a study is truly inadequate based on expert judgment, then it may be preferable to classify the hazard endpoint as a data gap. However, there is a very high bar to discount studies. Follow guidance in sub-section 11.3.2 to discount one or more studies.

11.3.4 Step 3d – Document hazard levels

It is essential to provide detailed documentation of the supporting data and rationale for all hazard levels in an assessment report.

1) GreenScreen Licensed Profilers and Authorized GreenScreen Practitioners must use the current version of the GreenScreen Chemical Assessment Template (See Template 1) for the assessment report.
2) Document each hazard level with a summary paragraph containing a scientifically defensible and logical rationale. Include the following elements in each summary paragraph: 1) hazard level, 2) rationale for hazard level, 3) confidence level, 4) rationale for confidence level.
3) Document all supporting data following the guidelines below:
   a. Indicate results from the review of all GreenScreen Specified Lists. It is assumed that all GreenScreen Specified Lists are searched unless otherwise indicated in the assessment report.
   b. Report a single study only once per hazard endpoint. If a study appears in multiple secondary data sources, these multiple data sources are noted, but the study results should not be reported more than once to avoid giving a false sense of the strength of evidence.

c. Cite each study separately, even when using a secondary data source that summarizes a number of studies together. Clearly indicate the relevant values in each study and how the values compare to GreenScreen Chemical Hazard Criteria.

d. Cite effects from a study only under the appropriate hazard endpoint. For example, if a study includes both reproductive and developmental effects, the effects related to reproductive toxicity are listed under Reproductive Toxicity and effects related to developmental toxicity are listed under Developmental Toxicity.

e. Clearly indicate the route of exposure (e.g., oral, dermal, inhalation) for each study for relevant hazard endpoints. These include at a minimum Carcinogenicity, Reproductive Toxicity, Developmental Toxicity, Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects, and Neurotoxicity.

f. For animal studies, clearly indicate the test species used.

g. Indicate whether the data are measured or estimated. For estimated data, specify the suitable analog or model used.

h. Reference all data sources. References may be included at the end of each hazard endpoint section or at the end of the document.

11.3.5 Step 3e – Fill in the Hazard Summary Table

The Hazard Summary Table is part of Template 1 – GreenScreen Chemical Assessment Report Template, and is used to assign a Benchmark score.

Fill in the designated hazard level for each hazard endpoint in the respective box of the Hazard Summary Table. An example of a fully populated Hazard Summary Table is shown below in Table 1.

1) Indicate the level of confidence using specified fonts (i.e., **BOLD** versus *ITALIC*).

2) Indicate hazard endpoint(s) with insufficient information to classify the hazard level in the Hazard Summary Table using a non-bold, non-italicized, and capitalized "DG" in the respective box.

3) The following color scheme is required for shading the box containing the hazard level for each hazard endpoint:

Hazard Level	Meaning	Color	Example
vL	Very Low	Deep Green	vL
L	Low	Light Green	L
M	Moderate	Yellow	M
H	High	Red	H
vH	Very High	Deep Red	vH
DG	Data Gap	White	DG
Blank	Not Assessed	(none)	
NA*	Not Applicable	Gray	NA

* Note: The "Not Applicable (NA)" hazard level is reserved for the Climate Impact endpoints (ODP, GWP) and is assigned to non-volatile compounds or for substances that are not gases or vapors under normal conditions.

TABLE 1. **Example GreenScreen Hazard Summary Table for a Chemical**

Group I Human					Group II and II* Human								Ecotex		Fate		Physical		Climate Impact	
C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F	ODP	GWP
						SINGLE	REPEATED*	SINGLE	REPEATED*												
DG	*L*	*L*	**M**	**M**	DG	*L*	*L*	**M**	**M**	**L**	**L**	**L**	**L**	*L*	*L*	*vH*	*M*	*L*	*L*	**L**	**L**

Glossary of GreenScreen® Hazard Endpoint Abbreviations

Group I Human:
C Carcinogenicity
M Mutagenicity
R Reproductive Toxicity
D Developmental Toxicity
E Endocrine activity

** Repeated exposure*

Group II and II* Human:
AT Acute mammalian toxicity
ST Systemic toxicity
N Neurotoxicity
SnS Skin sensitization
SnR Respiratory sensitization
IrS Skin irritation
IrE Eye irritation

Ecotox:
AA Acute aquatic toxicity
CA Chronic aquatic toxicity

Fate:
P Persistence
B Bioaccumulation

Physical:
Rx Reactivity
F Flammability

Climate Impact:
ODP Ozone Depletion Potential
GWP Global Warming Potential

4) It is optional to include an additional Hazard Summary Table that shows the hazard level of relevant hazard endpoints by each route of exposure separately. This optional table is provided in the Appendix of Template 1 – GreenScreen Chemical Assessment Report Template.

11.4 Step 4 – Identify Environmental Transformation Product(s)

The GreenScreen Benchmark score for a chemical includes the evaluation of the chemical itself (i.e. parent chemical) and any feasible and relevant environmental transformation product(s) of the parent chemical.

The goal is to identify only those environmental transformation products that are both feasible and relevant because they: 1) are known or likely to form; and 2) are more persistent, bioaccumulative, and/or toxic than the parent chemical.

11.4.1 Identify potential environmental transformation products

The first step is to identify potential environmental transformation product(s) of the parent chemical. Identifying environmental transformation products can be challenging and will require the use of expert judgment. Transformation products for most chemicals are not well studied.

Review literature and other sources for information on known transformation pathways and products.

Note: evaluation of metabolic transformation products is incorporated into the hazard assessment for the parent chemical and is outside of the scope and intention of environmental transformation products and this section.

11.4.2 Determine if feasible

For each environmental transformation product identified, determine whether it is feasible. Then fill in the table in the assessment report template to indicate whether it is feasible or not.

1) Feasible means the transformation product is likely to occur because: 1) the structure of the parent chemical allows for certain types of transformations (e.g., hydrolysis); and 2) those transformations are likely to occur based on the functional use of the

chemical across its life cycle (e.g., used in products that are discharged to water).

2) Identification of feasible environmental transformation products will require expert judgment and best available knowledge of the parent chemical's structure, physical/chemical properties, functional use and partitioning in environmental media.

3) Resources are provided in Annex 9. As a guide, consider the following questions:

   a. Does the parent chemical contain functional groups that can hydrolyze? Oxidize? Photolyze? Undergo oxidation or reduction? Are there structural alerts for these transformations? What are the kinetics? The faster the transformation, the more likely that a transformation product will form and result in exposure.

   b. Has the chemical been tested or modelled for biodegradability? Under what conditions? What test methods have been used and what media do they represent (e.g., aerobic freshwater, wastewater treatment, anaerobic biodegradation, marine environment, soil, sediment, etc.)? Is the biodegradation primary or ultimate? What are the kinetics?

   c. Based on the known functional use of the chemical in a product and the life cycle of the product, is the chemical likely to undergo the feasible transformation pathways?

   d. Provide a rationale for the selection and deselection of feasible environmental transformation products.

11.4.3 Determine if relevant

For each *feasible* environmental transformation product identified, determine if it is also relevant. Then fill in the table in the assessment template to indicate whether it is relevant.

1) Relevant means the transformation product is: 1) persistent enough to be encountered after use or release of the parent chemical; and 2) not a substance necessary for life or commonly formed in the ambient environment.

2) The worksheet provided in Annex 9 can be used as an internal resource for this step, if desired.

   a. Transformation products that are persistent, bioaccumulative, and/or toxic should be considered relevant whether predicted or found in the environment through monitoring (e.g., formation of DDD from DDT). A transformation product is not considered relevant if it is determined by expert judgment to be transient (e.g., an intermediate formed briefly and subsequently degraded, such as during aquatic biodegradation).

   b. Products of ultimate biodegradation/mineralization (i.e., CO_2 and H_2O) are not considered relevant. Transformation products of chemicals that degrade rapidly and completely (i.e., ultimate biodegradation) are unlikely to form persistent biodegradation intermediates and are therefore not considered relevant. This corresponds to meeting criteria for very Low Persistence in GreenScreen (or Low Persistence with expert judgment).

   c. It is helpful to keep in mind when identifying relevant transformation products that GreenScreen assessments are typically used for comparative purposes.

Those transformation products that help discriminate between alternative parent chemicals may be considered relevant.

d. Provide a rationale for the selection and deselection of relevant environmental transformation products.

11.5 Step 5 – Assess Environmental Transformation Product(s)

Assess each feasible and relevant environmental transformation product identified in Step 4 above using GreenScreen List Translator (Section IV) at a minimum. It is optional to conduct a GreenScreen assessment of the feasible and relevant environmental transformation product(s) to obtain more comprehensive results. Record the List Translator score or Benchmark score for each feasible and relevant environmental transformation product in the transformation product table in the assessment template.

11.6 Step 6 – Assign a GreenScreen Benchmark™ Score

First, assign a preliminary Benchmark score by comparing the completed Hazard Summary Table for the chemical to the organic or inorganic Benchmark Criteria (Annex 3 or 4, respectively). Next, perform a data gap analysis (see sub-section 11.6.2.1). Consider feasible and relevant environmental transformation products (see sub-section 11.6.2.2) to assign a final Benchmark score.

11.6.1 Step 6a – Determine the preliminary Benchmark score

GreenScreen Benchmark™ Criteria apply to individual and groups of hazard endpoints. The Benchmark Criteria for Organic Chemicals can be found in Annex 3 and the Benchmark Criteria for Inorganic Chemicals can be found in Annex 4. All criterion statements for Benchmark-1 must be "false" for the chemical of interest in order to proceed to the Benchmark-2 criteria and similarly for Benchmark-3 and Benchmark-4. For a given Benchmark, if any one (or more) criterion statement(s) is "true" for the chemical, the chemical is assigned the Benchmark score of the "true" criterion statement.

As an example for an organic chemical, the following steps outline the procedure for each Benchmark score, and the table provided in Annex 6 can be used as a worksheet, if desired. The "+" in the criterion statements means "AND," and the abbreviations for hazard endpoints can be found in the Benchmark Criteria (Annex 3 and 4).

1) **Benchmark-1:** Determine if any of the following Benchmark-1 criterion statements (a–e) are true for the chemical being assessed. A Benchmark-1 is established if any one or more Benchmark-1 criterion statements are true. Once a Benchmark-1 score is established, it is not necessary to proceed to Benchmark-2. If all the following criterion statements (a-e) are false for the chemical, proceed to Benchmark-2 criteria.
   a. PBT = High P + High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
   b. vPvB = very High P + very High B
   c. vPT = very High P + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
   d. vBT = very High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
   e. High T (Group I Human)
2) **Benchmark-2:** Determine if any one or more of the following Benchmark-2 criterion statements are true for the chemical being assessed.

A Benchmark-2 is established if any one or more Benchmark-2 criterion statements are true. Once a Benchmark-2 score is established, and it is not necessary to proceed to Benchmark-3. If *all* the following criterion statements (a-g) are false for the chemical, proceed to Benchmark-3 criteria.

a. Moderate P + Moderate B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
b. High P + High B
c. High P + Moderate T (Ecotoxicity or Group I, II or II* Human)
d. High B + Moderate T (Ecotoxicity or Group I, II or II* Human)
e. Moderate T (Group I Human)
f. Very High T (Ecotoxicity or Group II Human) or High T (Group II* Human)
g. High Flammability or High Reactivity

3) **Benchmark-3:** Determine if any one or more of the following Benchmark-3 statements are true for the chemical being assessed.

A Benchmark-3 is established if any one or more Benchmark-3 statements are true. Once a Benchmark-3 score is established, it is not necessary to proceed to Benchmark-4. If all the following criterion statements (a-d) are false for the chemical, proceed to Benchmark-4 criteria.

a. Moderate P or Moderate B
b. Moderate Ecotoxicity
c. Moderate T (Group II or II* Human)
d. Moderate Flammability or Moderate Reactivity

4) **Benchmark-4**: Determine if the following Benchmark-4 criterion statement is true for the chemical being assessed.

A Benchmark-4 is established if all aspects of the following Benchmark-4 criterion statement are true.

a. Low P + Low B + Low T (Ecotoxicity, Group I, II and II* Human) + Low Physical Hazards (Flammability and Reactivity) + Low (additional ecotoxicity endpoints when available). See exceptions for inorganics in Annex 4.

11.6.2 Step 6b – Determine the final Benchma k score

1) Conduct a Data Gap Analysis

a. Data requirements become more stringent with higher Benchmark scores. With reliable information on a single endpoint, one can confidently assess a chemical and assign a score of Benchmark-1. Additional data are needed to assess a chemical and confidently assign it a higher Benchmark score. The number and type of data gaps must be considered when assigning a Benchmark score to a chemical. Follow the procedure in Annex 5 to determine whether the preliminary Benchmark score will be modified due to lack of sufficient data when assigning a final Benchmark score.

b. When a chemical fails to meet the data requirements for the preliminary Benchmark score, the chemical is assigned a final Benchmark score that is lower than the preliminary Benchmark score (i.e. Benchmark-2 is lower than Benchmark-3), and equal to the Benchmark score of the highest level of data requirements met by the chemical. The final Benchmark score carries a subscript DG to indicate

that data gaps are driving the final Benchmark score.

c. When a chemical meets the data requirements for the preliminary Benchmark score, the chemical is assigned a final Benchmark score that is equal to the preliminary Benchmark score.

2) Evaluate Environmental Transformation Products

If a feasible and relevant environmental transformation product is more hazardous than the parent compound, then the GreenScreen List Translator or GreenScreen Benchmark score of the transformation product is used to modify the Benchmark score of the parent compound.

Each feasible and relevant environmental transformation product must be assessed using GreenScreen List Translator (See Section IV), except for cases where the parent chemical is a Benchmark-1. It is optional to conduct a more comprehensive assessment of feasible and relevant environmental transformation products using GreenScreen (Section II or III) instead.

Follow the steps below to determine whether the parent chemical Benchmark score must be modified due to a feasible and relevant environmental transformation product.

a. Using GreenScreen Benchmark score(s) (optional alternative):

i. Identify the lowest scoring feasible and relevant environmental transformation product. This is done by reviewing the Benchmark score for each feasible and relevant environmental transformation product and selecting the one with the lowest numerical value (i.e. Benchmark-2 is lower than Benchmark-3).

ii. Compare the Benchmark score of the parent chemical to the Benchmark score of the lowest scoring feasible and relevant environmental transformation product and apply the following:

1. If the Benchmark score of the transformation product is lower than the Benchmark score of the parent chemical, then modify the Benchmark score of the parent chemical to the Benchmark score of the transformation product and add a subscript (TP) (e.g., Benchmark-2_{TP}). The subscript (TP) transparently communicates the parent chemical was assigned a higher Benchmark score and the Benchmark score was lowered based on the score of the environmental transformation product. For example, if the parent chemical was assigned a Benchmark score of 2 and the transformation product was assigned a Benchmark score of 1, then the Benchmark score of the parent chemical is modified to Benchmark-1_{TP}.

2. If the Benchmark score of the transformation product is Benchmark-U, then expert judgment should be used to determine whether the parent chemical Benchmark score should be modified.

3. Report the modified Benchmark score and the rationale for the modified Benchmark score in the GreenScreen Benchmark score and Hazard Summary Table section of Template 1 - GreenScreen Chemical Assessment Report Template.

b. Using GreenScreen List Translator score(s) (minimum required):

Review the List Translator score of each of the feasible and relevant environmental transformation products identified. Then follow the steps below in order.

i. If one or more feasible and relevant environmental transformation products were assigned a score of LT-1, assign a final Benchmark score of Benchmark-1_{TP} to the parent chemical. If not, proceed.

ii. If one or more feasible and relevant environmental transformation products were assigned a score of LT-P1, conduct more research for each to determine whether the transformation product is LT-1 or LT-UNK. If after further research, one or more of the feasible and relevant environmental transformation products is determined to be LT-1, assign a final Benchmark score of Benchmark-1_{TP} to the parent chemical. If not, proceed.

iii. If all feasible and relevant environmental transformation products are assigned a score of either LT-UNK (initially or after further research) or NoGSLT, do not modify the Benchmark score of the parent chemical.

11.6.3 Step 6c – Document the Benchmark score

Follow all requirements in sub-section 3 and 4 related to documenting a Benchmark score. In addition, the Benchmark score summary paragraph should include the following three elements:

1) **Benchmark:** Report the final Benchmark score assigned to the parent chemical based on the inherent hazards associated with the chemical and consideration of data gaps and transformation products as comprehensively defined in this documentation:
   a. Scores modified due to data gaps carry a subscript DG (e.g., Benchmark-2_{DG}).
   b. Scores modified due to environmental transformation products carry a subscript TP (e.g., Benchmark 1_{TP}).
2) **Rationale:** Include detailed rationale for the final Benchmark score assigned:
   a. If known hazards of the chemical are driving the final Benchmark score, include the hazard endpoint(s) and GreenScreen Benchmark criterion(a) driving the score; or
   b. If data gaps are driving the final Benchmark score, include the final Benchmark score assigned, the preliminary Benchmark score assigned, and data gap(s) and data requirements driving the Benchmark score; or
   c. If a transformation product is driving the final Benchmark score, include the final Benchmark score assigned, the preliminary Benchmark score assigned, the identity of the transformation product driving the Benchmark score (i.e. chemical name, CASRN) and the rationale for why it is considered both feasible and relevant.
3) **Worst-case:** When one or more data gaps are present for the parent chemical, include a worst-case Benchmark score estimate. This is the Benchmark score that would be assigned if all the data gaps were filled with the highest possible hazard level.

12. INORGANIC CHEMICAL ASSESSMENT PROCEDURE

The physical properties of inorganic chemicals are particularly relevant to assessing their inherent hazard and toxicity, such as solubility, bioavailability, and particle size. For example, water solubility can modify the hazard classification of aquatic toxicity, and particle size and shape can determine the potential for a chemical to cause respiratory irritation. Follow the organic chemical assessment procedure in sub-section 11, with the following additions and/or modifications for inorganic chemicals:

12.1 Step 1 – Identify Chemical to Assess

Follow the guidance in sub-section 11 Step 1.

12.2 Step 2 – Research

In addition to following the guidance in sub-section 11 Step 2, research and report the following form and physical chemical properties of the inorganic chemical in Section VI, Template 1 – GreenScreen Chemical Assessment Report Template.

1) Particle size (e.g., silica particles < 10 microns)
2) Structure (e.g., amorphous vs. crystalline)
3) Mobility (e.g., water solubility, volatility)
4) Bioavailability

12.3 Step 3 – Classify Hazards

Follow guidance in sub-section 11 Step 3 for an inorganic chemical or inorganic feasible and relevant environmental transformation product.

In addition to guidance in sub-section 11 Step 6, make sure to include the inorganic reporting section of the template.

Place an asterisk "*" after the hazard level for Persistence in the respective box of the Hazard Summary Table and include a footnote indicating that the chemical is inorganic.

12.4 Step 4 – Identify Environmental Transformation Products

In addition to following the guidance in sub-section 11 Step 4, consider dissociation products, moieties, and valence states as potential environmental transformation products of inorganic chemicals.

12.5 Step 5 – Assess Environmental Transformation Products

Same as organic chemical guidance. Follow guidance in sub-section 11 Step 5.

12.6 Step 6 – Assign a Benchmark Score

12.6.1 For inorganic chemicals, Persistence should not necessarily be considered a negative characteristic – particularly for naturally occurring substances such as minerals and metal oxides. For this reason, the Benchmark Criteria for Inorganic Chemicals in Annex 4 have been modified in comparison to the Benchmark Criteria for Organic Chemicals in Annex 3 so that Persistence is only considered in combination with chronic hazards. Inorganic chemicals that are persistent and for which all hazard endpoints except Persistence are low may achieve Benchmark-4.

12.6.2 For Benchmarks-1, -2, and -3, Persistence is only considered in combination with Group I, Group II* and Chronic Aquatic Toxicity hazard endpoints. Persistence is not considered in combination with Group II or Acute Aquatic Toxicity hazard endpoints.

12.6.3 Apply the Inorganic Benchmark Criteria in Annex 4 to assign a preliminary Benchmark score, and determine the final Benchmark score using the same procedure as for organic chemicals.

Section II — Assessing Polymers

13. PURPOSE

Section II outlines the procedure to be used to assess and classify hazards of polymers.

Follow the procedure in Section III, sub-section 20 for evaluating polymeric materials.

14. SCOPE

The scope of assessment described in Section II includes the multiple molecular species that make up a polymer. Within GreenScreen, two polymer types have been defined: polymer substance and polymer mixture (see Terms and Definitions). It is noted that most thermoplastic polymers will be polymer substances, while thermoset polymers may be polymer substances or polymer mixtures, depending on the stage in the manufacturing process at which they are being evaluated. In general, if the polymer contains unreacted monomer by intention (i.e., it is being evaluated at a stage where it is not fully reacted), then it should be evaluated following the steps provided for polymer mixtures. If the polymer is fully reacted and any monomer present is considered residual (an impurity), then it should be evaluated following the steps provided for polymer substances.

15. POLYMER ASSESSMENT PROCEDURE

Figure 3 provides an overview of the assessment process for polymer substances and polymer mixtures.

15.1 Step 1 – Identify Polymer Type and Inventory Constituents and/or Components

Determine whether the assessment is for a polymer substance or polymer mixture.
See Term & Definitions.

Within GreenScreen, hazard classification for endpoints is based on consideration of constituents in polymer substances or components in polymer mixtures if toxicological data are not available for the polymer substances or mixtures themselves. The constituents in polymer substances and components in polymer mixtures which must be evaluated have been outlined in Section 15.1.1 and Section 15.1.2, respectively.

For the inventory of constituents within the polymer substance or components within the polymer mixture, the assessor must provide a description of the method used to determine compliance with the thresholds listed below (i.e., analytical testing, supplier attestations, and/or supply chain research). If analytical testing is used, it is recommended to include test method and detection limit.

15.1.1 Polymer substance

A polymer substance inventory includes the constituents depicted in Figure 4 below. Collect information regarding physical and chemical characteristics of the polymer substance. Record all information in the GreenScreen Polymer Substance Assessment Report Template (Section VI, Template 2).

FIGURE 3. **GreenScreen Polymer Assessment Process**

STEP 1 Inventory

1 – Collect formulation and structural and physical property information for the polymer substance or polymer mixture.

STEP 2 Classify Hazards of Polymer

2a – Use Test Data for Polymer: classify hazard endpoints for the polymer using measured, experimental test data. Apply the GreenScreen Polymer Hazard Criteria in Annex 7.

2b – Apply Bridging Principles for Similar Polymer: classify any remaining hazard endpoints for the polymer using measured, experimental test data for a similar polymer. Apply Bridging Principles and the Polymer Hazard Criteria in Annex 7.

2c – Apply Hazard Criteria for Qualifying Constituents or Components: classify any remaining hazard endpoints for the polymer using measured and/or estimated data on "qualifying" polymer constituents or components. See sub-section 15.2.3 to determine which constituents or components qualify for inclusion and Annex 8 for the Qualifying Constituent/Components Hazard Criteria.

2d – Apply Expert Judgment: expert judgment is applied to assign any Low hazard levels when considering Reactive Functional Groups (RFGs), Bioavailability, Solubility and Charge, and Swellability.

STEP 3 Classify Hazard for Fate & Physical Hazard Endpoints

3 – Use reliable, measured test data available for the polymer: classify Persistence (P), Bioaccumulation (B), Reactivity (R), and Flammability (F) using the GreenScreen Chemical Hazard Criteria in Annex 1. Expert judgment may be used to predict behavior in the environment based on a given polymer's structure, if experimental, measured data are not available.

STEP 4 Determine Polymer Benchmark

4a – Preliminary Benchmark Score: compare the polymer hazard levels generated above to the GreenScreen Benchmark Criteria to get a Preliminary Benchmark score for the polymer (Annex 3 for organics, Annex 4 for inorganics).

4b – Final Benchmark score:

i. **Potential Chemicals of High Concern (CoHC)** – For each Group I Human Health endpoint that was classified using Step 2c and assigned a hazard level of moderate, low, or data gap, classify each monomer and/or catalyst present at or above 100 ppm using the GreenScreen Chemical Hazard Criteria in Annex 1. Any High classifications will result in a Benchmark-1_{CoHC} for the polymer.

ii **Data Gaps** – Determine whether the preliminary Benchmark score assigned in Step 4a should be modified due to failure to meet minimum data requirements following the procedure in Annex 5.

iii. **Environmental Transformation Products (TP)** – Generate a Benchmark or List Translator score for each feasible and relevant environmental transformation product. Scores are used to modify the polymer Benchmark score as described in Section 15.4.2.3.

FIGURE 4. **Inventory Constituents of a Polymer Substance**

POLYMER SUBSTANCE

- Polymer species of varying lengths
- Residual monomer(s) ≥ 100 ppm
- Oligomers
- Stabilizer(s) ≥ 100 ppm
- Substance impurities ≥ 100 ppm
- Special Case impurities < 100 ppm*

* Special case impurities <100 ppm (0.01%) are scored and reported separately using the GreenScreen List Translator.

15.1.2 Polymer mixture

A polymer mixture inventory includes the components depicted in Figure 5 below. Collect information regarding physical and chemical characteristics of the polymer mixture. Record all information in the GreenScreen Polymer Mixture Assessment Report Template (Section VI, Template 3).

For polymer mixtures, it is necessary to specify the life cycle stage being assessed in the GreenScreen assessment report, which will be 1) "as placed on the market" (liquid or low molecular weight solid with significant intentionally added unreacted monomer); or 2) "semi-cured" (what is known in the composites sector as "pre-preg"). Because there are differing levels of unreacted monomers at different stages, a polymer mixture may have a different Benchmark score depending on the life-cycle stage being considered. A "fully cured" polymer (high molecular weight, fully cross-linked matrix) is considered a polymer substance and the constituents are inventoried as described in 15.1.1.

FIGURE 5. **Inventory Components of a Polymer Mixture**

POLYMER MIXTURE

- Unreacted monomer(s) ≥ 100 ppm

POLYMER SUBSTANCE

- Polymer species of varying lengths
- Oligomers
- Stabilizer(s) ≥ 100 ppm
- Substance impurities ≥ 100 ppm
- Special case impurities < 100 ppm*

* Special case impurities <100 ppm (0.01%) are scored and reported separately using the GreenScreen List Translator.

15.2 Step 2 – Classify Human Health and Ecotoxicity Hazards of Polymer

The stepwise process of classifying the human health and ecotoxicity hazard endpoints for a polymer substance or mixture is outlined in this Section 15.2. Document hazard levels in the Polymer Hazard Summary Table located in the GreenScreen Polymer Substance Assessment Report Template or the GreenScreen Polymer Mixture Assessment Report Template, as appropriate (See Section VI for templates).

15.2.1 Step 2a – Use test data for the polymer

In classifying human health and ecotoxicity hazards, highest preference is given to reliable measured test data on the polymer substance or mixture of interest (i.e., specific to the manufacturer and trade name, representative of number average molecular weight (Mn), and the type and level of residual or unreacted monomers and oligomers present). Review available polymer substance or mixture test data against the GreenScreen Polymer Hazard Criteria in Annex 7 to classify hazard endpoints and record in the Polymer Hazard Summary Table.

15.2.2 Step 2b – Apply bridging principles for a similar polymer

For any unclassified hazard endpoint(s) from Step 2a above, collect measured test data on a similar polymer substance or mixture. For a polymer to be considered similar, the level of residual or unreacted monomers and other impurities must be equal to or greater than the concentration of the same monomer or impurity in the original polymer. Hazard classification is accomplished by applying Bridging Principles and the GreenScreen Polymer Hazard Criteria in Annex 7. Guidance on applying the Bridging Principles can be found in Section 3.2.3.2 in GHS Rev.7.[5]

15.2.3 Step 2c – Apply hazard criteria for qualifying constituents or components

Where reliable measured test data on the polymer substance or mixture itself (Step 2a) or Bridging Principles on a similarly tested polymer substance or mixture (Step 2b) cannot assist in classifying hazard endpoints, data on individual qualifying constituents of the polymer substance or components of the polymer mixture are used to classify any remaining human health and ecotoxicity hazard endpoints.

Proceed through the steps below.

1) Identify Qualifying Constituents or Components
    a. For polymers substances with Mn ≥ 1000 Da[6]:
        i. Include residual monomers, stabilizers and other substance impurities present at ≥ 1000 ppm (0.1%) in the classification of the polymer substance following the GreenScreen Polymer Qualifying Constituent/Component Hazard Criteria in Annex 8;[7] If the number average molecular weight of the polymer substance is ≥ 1000 and < 10,000 Da and if oligomers with molecular weight <500 Da are present at ≥10%; and/or oligomers with molecular weight

5 https://www.unece.org/trans/danger/publi/ghs/ghs_rev07/07files_e0.html, accessed 9/20/17

6 In the case of a polymer substance with a number average molecular weight of <1000 Da, models such as the U.S. Environmental Protection Agency's EPI Suite™ (version 4.1) (as documented in the Sustainable Futures/P2 Framework Manual) may be used to estimate key chemical properties, where test data are not available (i.e., polymer substance hazards are not classified based on separate consideration of polymer substance constituents). As is always the case, predictions from modeling software should not be used if acceptable measured data are available, but measured data can be entered into EPI Suite™ to replace conservative default assumptions to improve the estimations of the other properties. All model limitations must be observed.

7 The Polymer Qualifying Constituent/Component Hazard Criteria are based on GHS mixture rules with adaptations for some hazard endpoints.

<1,000 Da are present at ≥25%, then also include their hazards in the classification of the polymer substance following the GreenScreen Polymer Qualifying Constituent/Component Hazard Criteria in Annex 8.

ii. If the number average molecular weight of the polymer substance is ≥ 10,000 Da and if oligomers with molecular weight <500 Da are present at ≥2%; and/or oligomers with molecular weight <1,000 Da are present at ≥5%, then also include their hazards in the classification of the polymer substance following the GreenScreen Polymer Qualifying Constituent/Component Hazard Criteria in Annex 8.

iii. If conditions above are not met, oligomers are not considered qualifying constituents of the polymer substance and do not need to be assessed.

b. For polymer mixture components:

i. Evaluate the polymer substance first. Include stabilizers and other substance impurities present at ≥ 1000 ppm (0.1%) and qualifying oligomer species as determined above in the classification of the polymer substance following the GreenScreen Qualifying Constituent/Component Hazard Criteria in Annex 8.

ii. Evaluate the polymer mixture second. Include unreacted monomers, stabilizers and substance impurities present at ≥ 1000 ppm (0.1%) and qualifying oligomer species as determined above in the classification of the polymer mixture following the GreenScreen Qualifying Constituent/Component Hazard Criteria in Annex 8.

2) Assess Qualifying Constituents or Components and Record Results

a. Polymer Substance Constituents: Determine the hazard level for each human health and ecotoxicity hazard endpoint not classified in Steps 2a and 2b above based on the GreenScreen Qualifying Constituent/Component Hazard Criteria in Annex 8. Record results in the appropriate Polymer Hazard Summary Table.

b. Polymer Mixture Components: For polymer mixtures, the evaluation is first conducted for the polymer substance and second for the polymer mixture. For the polymer substance, determine the hazard level for each human health and ecotoxicity hazard endpoint not classified in Steps 2a and 2b above based on the GreenScreen Qualifying Constituent/Component Hazard Criteria in Annex 8 (excluding unreacted monomers) and record results in the appropriate Polymer Hazard Summary Table. Repeat the process for polymer mixtures, including unreacted monomer(s) as qualifying components and record results in the appropriate Polymer Hazard Summary Table.

15.2.4 Step 2d – Apply expert judgment

Apply expert judgment if there are no qualifying constituents or components, or if the assessment of qualifying constituent(s) or component(s) does not meet the criteria for vH, H, or M hazard level. Expert judgment is applied to determine if an L hazard level can be assigned. In addition, in some cases, it may be warranted to replace a hazard level assigned based on qualifying components or constituents with a higher hazard level due to certain characteristics of the polymer substance or mixture as discussed below. The assessor should apply expert judgment in these cases and document all rationale for final hazard levels in the GreenScreen assessment report.

Polymers that are "exempt" from the premanufacture notification (PMN) regulations for new chemical substances under §5 of the Toxic Substances Control Act (TSCA) are required to meet a variety of criteria outlined in the USEPA Polymer Exemption Guidance Manual (https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 11/27/17).

Criteria for EPA polymer exemption do not necessarily directly translate and align with GreenScreen hazard criteria for all hazard endpoints; therefore, an EPA-exempted polymer is not automatically assumed to have "Low" hazard for any GreenScreen hazard endpoint. However, assessors can use key chemical and physical characteristics of the exempted polymer as lines of evidence to support a hazard classification based on expert judgment.

1) Reactive Functional Groups (RFGs)

   The classification should take into consideration the presence of reactive functional groups on the polymer side chains. A key consideration is whether these side chain functional groups have the potential for biological functions and/or adverse effects. The USEPA Polymer Exemption Guidance Manual assigns key reactive functional groups a High, Moderate, or Low designation, and discusses how the RFGs might influence hazard classification for certain endpoints. This authoritative reference should be used as the main resource for applying expert judgment when assigning a hazard level based on RFG data.

2) Bioavailability

   To assign a Low hazard level to any GreenScreen hazard endpoint based on "lack of bioavailability," supporting evidence must show lack of bioavailability for all routes of exposure (i.e., inhalation, skin absorption, and oral). Following CLP Guidance, "conclusive scientific experimental data [must] show that the substance or mixture is not biologically available and those data have been ascertained to be adequate and reliable" (CLP; https://echa.europa.eu/documents/10162/23036412/clp_en.pdf/58b5dc6d-ac2a-4910-9702-e9e1f5051cc5, accessed 9/20/17). Any evaluation of the bioavailability of a polymer should take into account measured data for all relevant constituents or components and their potential to interact that might influence bioavailability.

   In general, any Low hazard level assigned based on bioavailability arguments must be supported by adequate analysis using strong scientific evidence, and a strength of evidence determination using expert judgment must be applied. Conclusions may be based on considerations of the physical properties of a substance or derived from Structural Activity Relationships (SAR) (CLP; https://echa.europa.eu/documents/10162/23036412/clp_en.pdf/58b5dc6d-ac2a-4910-9702-e9e1f5051cc5, accessed 9/20/17).

3) Solubility and Charge

   Water solubility is used to estimate how a chemical will distribute between environmental compartments (i.e., air, soil, or water/sediment). The scale for water solubility is provided below in Table 2 (EPA Sustainable Futures/P2 Manual, Section 5: Estimating Physical / Chemical and Environmental Fate Properties with EPI Suite; https://www.epa.gov/sites/production/files/2015-05/documents/05.pdf, accessed 9/20/17).

   The US EPA Interpretive Assistance Document for Assessment of Polymers provides guidance on assigning a Low hazard level for Acute Aquatic Toxicity based on solubility and charge (nonionic, anionic, cationic, and amphoteric) (USEPA Interpretive Assistance

Document for Assessment of Polymers—Sustainable Futures Summary Assessment (June 2013); https://www.epa.gov/sites/production/files/2015-05/documents/06-iad_polymers_june2013.pdf, accessed 12/15/17).

TABLE 2. **Water Solubility Classification**

Water Solubility (mg/L water @ 25 degrees C)	Classificatio
> 10,000	Very soluble
> 1,000 - 10,000	Soluble
> 100 - 1,000	Moderate solubility
> 0.1 – 100	Slightly soluble
< 0.1	Negligible solubility

4) Swellability

Per the USEPA Polymer Exemption Guidance Manual (https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 11/21/17), assessment of Carcinogenicity should take into account the water absorption properties (i.e., swellability) of the polymer. EPA makes the "may present an unreasonable risk" determination with concerns for fibrosis and cancer, based upon water absorption properties. Data show that cancer was observed in a two-year inhalation study in rats on a high molecular weight water-absorbing polyacrylate polymer (TSCA 8(e)-1795). Therefore, expert judgment should be used to classify Carcinogenicity for swellable polymers >70,000 Da.

Also per US EPA Polymer Exemption Guidance Manual, insoluble, non-swellable polymers >70,000 Da are expected to show irreversible lung damage linked with inhalation of highly respirable particles <10 microns and lack absorption potential are expected to show irreversible lung damage linked with inhalation of highly respirable particles. This is based on a study of toner used in copy machines, designated TSCA 8(e)-0668. The physical hazard is based on deposition to the deep lung and inability to dislodge the particles. Expert judgment should be used to classify Repeated Dose Systemic Toxicity for insoluble, non-swellable polymers with molecular weights >70,000 Da that are respirable (<10 micron).

15.3 Step 3 – Classify Environmental Fate and Physical Hazards of Polymer

Since the process outlined in Step 2 is based on GHS mixture rules with some adaptations, and GHS mixture rules do not apply to the environmental fate and physical hazard endpoints in GreenScreen, this section outlines the process to be used to classify these hazards.

15.3.1 Environmental fate endpoints – Persistence (P) and Bioaccumulation (B)

First determine whether reliable measured test data are available for the polymer substance or mixture itself to evaluate the Persistence (P) and Bioaccumulation (B) endpoints. If yes, use these data to classify the hazards of these endpoints based on the GreenScreen Chemical Hazard Criteria in Annex 1. In the absence of test data for the polymer substance or mixture, and where modeling software may not provide reliable estimates for polymers ≥ 1000 Da, expert judgment may be used to predict behavior in the environment based on

chemical and physical properties. The U.S. EPA Sustainable Futures Interpretive Assistance Document for Assessment of Polymers can be used to support hazard classification in these cases (USEPA Interpretive Assistance Document for Assessment of Polymers—Sustainable Futures Summary Assessment (June 2013); https://www.epa.gov/sites/production/files/2015-05/documents/06-iad_polymers_june2013.pdf, accessed 12/15/17). Assessors should document the values listed in the correct Polymer Assessment Report Template for parameters used to derive hazard levels based on the GreenScreen Chemical Hazard Criteria, even if they are estimated and/or based on expert judgment.

15.3.2 Physical hazard endpoints – Reactivity (R) and Flammability (F)

If reliable measured test data are available for the polymer substance or mixture itself, these data should be used to classify hazards for the Reactivity (R), and Flammability (F) endpoints based on the GreenScreen Chemical Hazard Criteria in Annex 1. If such data are not available, expert judgment may be used to assign hazard levels based on polymer physical and chemical characteristics.

15.4 Step 4 – Determine Polymer Benchmark Score

For polymer substances, perform the following steps to determine the GreenScreen Benchmark score.

For polymer mixtures, first perform the following steps to determine the GreenScreen Benchmark score for the polymer substance, and second for the polymer mixture including unreacted monomer(s) as qualifying components.

The order of steps below determines the final Benchmark score (i.e., the Benchmark score from each subsequent step will replace the Benchmark score of the previous step, if it is lower). Any change to Benchmark scores per Step 4b, 4c, and 4d should be designated by including the subscripts “DG,” “CoHC,” or “TP,” respectively.

15.4.1 Step 4a – Generate a preliminary Benchmark score

Compare the polymer substance and/or polymer mixture hazard levels in the Polymer Hazard Summary Table generated in Steps 2 and 3 above to the GreenScreen Benchmark Criteria in Annex 3 to obtain a Preliminary Benchmark score. If the preliminary Benchmark score is Benchmark-1, skip step 4b and assign a final score of Benchmark-1.

15.4.2 Step 4b – Determine the final Benchma k score

1) Conduct Potential Chemical of High Concern (CoHC) Analysis

   Identify each **Group I Human Health Endpoint** requiring potential CoHC analysis. A Group I Human Health endpoint requires potential CoHC analysis if the endpoint was classified using Step 2c and was assigned a hazard level of moderate, low, or data gap for the polymer substance or polymer mixture. Perform the following steps for each Group I Human Health hazard endpoint that requires potential CoHC analysis.

   For polymer substances:

   Determine the hazard level for each residual monomer and/or catalyst present at or above 100 ppm using the GreenScreen Chemical Hazard Criteria in Annex 1 and record results in the Polymer Hazard Summary Table (see example in Table 3 below). If one or more residual monomer(s) and/or catalyst(s) assessed are assigned a high hazard level for any one or more Group I Human Health hazard endpoints, modify the polymer’s final Benchmark score to a Benchmark-1_{CoHC}.

For polymer mixtures:

Determine the hazard level for each unreacted monomer and/or catalyst present at or above 100 ppm using the GreenScreen Chemical Hazard Criteria in Annex 1 and record results in the Polymer Hazard Summary Table. If one or more unreacted monomer(s) and/or catalyst(s) assessed are assigned a high hazard level for any one or more Group I Human Health hazard endpoints, modify the polymer's final Benchmark score to a Benchmark-1_{CoHC}.

Report the modified Benchmark score and the rationale for the modified Benchmark score in the Benchmark and hazard summary section of the GreenScreen assessment report. To ensure transparency, hazard levels for residual/unreacted monomers and/or catalysts ≥ 100 ppm are reported separately from the polymer substance or polymer mixture as shown in Table 3.

Any data gaps for Group 1 Human Health hazard endpoints for residual or unreacted monomer and/or catalyst present at or above 100 ppm should be reported, however they do not impact the polymer's final Benchmark score when conducting a potential CoHC analysis.

2) Conduct a Data Gap Analysis

Follow the procedure outlined for chemicals in Section I, sub-section 11.6.2.1 and Annex 5 to perform a data gap analysis and determine whether the GreenScreen Benchmark score for the polymer substance or polymer mixture must be modified due to data gaps.

3) Evaluate Environmental Transformation Products

Follow the procedure outlined for chemicals in Section I, sub-section 11.6.2.2 and determine if the Benchmark score must be modified. Feasible and relevant environmental transformation products may result from chemical changes in which a polymer breaks down as the result of oxidation, hydrolysis, heat, sunlight, attack by solvents, microbial action, etc. (USEPA Polymer Exemption Guidance Manual; https://www.epa.gov/sites/production/files/2015-03/documents/polyguid.pdf, accessed 11/21/17).

16. DOCUMENT HAZARD LEVELS

16.1 Record the hazard levels for a polymer substance in the Hazard Summary Table of Template 2 – Polymer Substance Assessment Report Template (See Section VI). An example for a polymer substance is shown in Table 3.

Hazard levels for the Group I Human Health Endpoints are included for residual monomers and/or catalysts ≥ 100 ppm (0.01%) if one or more of these hazard levels were used to determine the final Benchmark score of the polymer substance.

16.2 Record the hazard levels for a polymer mixture in the Hazard Summary Table of Template 3 – Polymer Mixture Assessment Report Template.

Hazard levels for the Group I Human Health Endpoints are included for unreacted monomers and/or catalysts ≥ 100 ppm (0.01%) in the polymer mixture if one or more of these hazard levels were used to determine the final Benchmark score of the polymer mixture.

TABLE 3. **Example Polymer Hazard Summary Table for a Polymer Substance with a Residual Monomer > 100 ppm**

GreenScreen Polymer Hazard Summary Table																								
	Group I Human					Group II and II* Human									Ecotox		Fate		Physical		Climate Impact		
	Carcinogenicity	Genotoxicity/Mutagenicity	Reproductive Toxicity	Developmental Toxicity	Endocrine Activity	Acute Toxicity	Systemic Toxicity		Neurotoxicity		Skin Sensitization*	Respiratory Sensitization*	Skin Irritation	Eye Irritation	Acute Aquatic Toxicity	Chronic Aquatic Toxicity	Persistence	Bioaccumulation	Reactivity	Flammability	Ozone Depletion Potential	Global Warming Potential	
							SINGLE	REPEATED*	SINGLE	REPEATED*	*	*											BM
Polymer Substance	DG	**M**	*M*	*M*	DG	**H**	**M**	**M**	**vH**	*H*	**H**	*DG*	**H**	**H**	**vH**	**vH**	**H**	**L**	**M**	*L*	NA	NA	1_{COHC}
Residual Monomer at 250 ppm	**H**	**M**		**M**	*M*																		

Assume the assessor conducted the following steps to obtain the hazard summary table above:

1. Assessor identified which Group I Human Health endpoints required potential CoHC analysis:
   - Carcinogenicity – YES because assigned a data gap in step 2c
   - Mutagenicity – YES because assigned a moderate hazard level in in step 2c
   - Reproductive Toxicity – NO because assessed in step 2a
   - Developmental Toxicity – NO because assessed in step 2b
   - Endocrine Activity – Yes because assigned a data gap in step 2c
2. Assessor identified all monomer(s) and catalyst(s) present above 100 ppm:
   - Identified only one: Residual Monomer at 250 ppm
3. Assessor classified Carcinogenicity, Mutagenicity, and Endocrine Activity for the residual monomer using GreenScreen Chemical Hazard Criteria in Annex 1:
   - Carcinogenicity – HIGH
   - Mutagenicity – MODERATE
   - Endocrine Activity – MODERATE
4. Assessor assigned final score of Benchmark-1_{COHC} to polymer substance due to high carcinogenicity for residual monomer present at 250 ppm in the polymer substance.

Section III — Assessing Products

17. PURPOSE

Section III describes the procedure for assessing a product. A product assessed using GreenScreen does not receive a single Benchmark score. Instead, each constituent or component present in a product above the disclosure and assessment thresholds specified in this section is assessed and receives a Benchmark score.

The product reporting requirements described in this section ensure transparency, facilitate informed comparisons between products, and enable organizations to integrate their priorities and values into the decision-making process.

For making product claims, GreenScreen Certified™ is an optional certification offered by Clean Production Action. See the Clean Production Action website for additional information on GreenScreen Certified (https://www.greenscreenchemicals.org/certified, accessed 9/15/17).

18. SCOPE

Three types of products are considered in this section:

1) Non-polymeric product:
    a. Chemical substance – a single-component trade name product that contains two or more chemical compounds, and
    b. Chemical mixture – a multi-component trade name product containing two or more chemical substances.
2) Polymeric material – a multi-component trade name product that contains one or more polymer substance(s) or polymer mixture(s) in addition to functional additives. Examples of polymeric materials include compounded plastics, adhesives, foams, and resins.
3) Variable product types include the following. They can contain one or more non-polymeric or polymeric components:
    a. Homogeneous material
    b. Article

19. ASSESSMENT AND DISCLOSURE THRESHOLDS: NON-POLYMERIC PRODUCTS

19.1 Chemical Substances

19.1.1 Each intentionally added chemical compound in the chemical substance present at greater than 0 ppm (0%) must be assessed per Section I.

19.1.2 Each impurity present at greater than or equal to 100 ppm (0.01%) in the chemical substance must be assessed per Section I.

19.1.3 Each special case impurity present below 100 ppm (0.01%) must be screened using the GreenScreen List Translator following the procedure in Section IV.

19.1.4 It is best practice (but not mandatory) to provide the identity and CASRN of all known impurities present below 100 ppm and to screen them using the GreenScreen List Translator (See Section IV).

19.2 Chemical Mixtures

A chemical mixture contains two or more chemical substances as components, and those chemical substances must be assessed according to 19.1 above.

20. ASSESSMENT AND DISCLOSURE THRESHOLDS: POLYMERIC MATERIALS

20.1 Each polymer substance or polymer mixture > 0 ppm must be assessed per Section II.

20.2 Each intentionally added chemical substance (functional additive) present at > 0 ppm must be assessed according to sub-section 19.1.

20.3 Each intentionally added chemical mixture (functional additive) present at > 0 ppm must be assessed according to sub-section 19.2.

20.4 Polymeric Material Impurities (impurities imparted to the polymeric material from a source other than the intentionally added components):

20.4.1 Each impurity present at greater than or equal to 100 ppm (0.01%) in the polymeric material must be assessed per Section I.

20.4.2 Each special case impurity present below 100 ppm (0.01%) in the polymeric material must be screened using GreenScreen List Translator following the procedure in Section IV.

20.4.3 It is best practice (but not mandatory) to provide the identity and CASRN of all known impurities present below 100 ppm and to screen them using the GreenScreen List Translator. (See Section IV).

21. GUIDANCE FOR ALL PRODUCT TYPES

21.1 If there are undisclosed, unknown, or proprietary constituents and/or components, seek additional information. The following approaches are suggested:

21.1.1 Seek information on the identity of constituents or components from the next supplier upstream; or

21.1.2 Ask the next supplier upstream to conduct their own GreenScreen assessment and report results; or

21.1.3 Ask the next supplier upstream to screen the constituents and/or components using GreenScreen List Translator and report the results; or

21.1.4 List all unknowns as "Not Reported" with concentrations in parent product.

21.2 Where > 0 ppm (0%) or 100 ppm (0.01%) is not feasible or practicable (i.e., supply chain will not/cannot disclose all chemicals), a value of 1000 ppm (0.1%) may be used.

21.2.1 Where GreenScreen disclosure and assessment requirements are not applied and a different disclosure level is used, it is mandatory that the disclosure level be provided, as well as the reasoning, in the assessment report for every intentionally added constituent or component. This will allow for the equivalent comparison of alternatives.

21.2.2 Referencing GreenScreen in other standards or metrics must specify the disclosure level applied (both for intentionally added constituents or components and impurities).

22. PRODUCT REPORTING TEMPLATE

22.1 General Template Guidelines

22.1.1 GreenScreen Benchmark Summary Section:

1) Ensure the product template meets the general requirements in sub-sections 3 and 4 of this document.
2) The product does not receive a single Benchmark score.
3) Report product components and constituents at exact concentrations (include trade name, chemical name and CASRN). If this is not feasible (e.g., due to confidentiality reasons), report concentration ranges.
4) Denote any product input as "Not Reported (NR)" in the Benchmark summary section of the template if it is unable to be assessed because a supplier will not provide formulation data.
5) Report the percent (%) of the product at each Benchmark score.

22.1.2 Inventory Thresholds Section:

1) List the product inventory thresholds achieved and any deviations from GreenScreen requirements in this section of the product template.
2) For the product inventory, the assessor must provide a description of the method used to determine compliance with the inventory thresholds (i.e., analytical testing, supplier attestations, and/or supply chain research). If analytical testing is used, it is recommended to include test method and detection limit.

22.2 Template 4 – Product Assessment Reporting Template

22.2.1 Follow the general template guidelines listed above in sub-section 22.1.

22.2.2 Clearly indicate the manufacturer and trade name of the product evaluated and the product inventory in Table 1 of Template 4.

22.2.3 Report scores for Special Case Impurities in Table 2 of Template 4. See Figure 6 below. If other known impurities present below 100 ppm in the product were assessed, report the scores in Table 2 as well.

22.2.4 Ensure all sections of Template 4 are filled in. Attach a separate assessment report for each chemical compound, polymer substance, and/or polymer mixture assessed in the product.

FIGURE 6. **Example Template 4 Report for an Uncured Polymeric Material**

(All information in this example is for illustration purposes only)

GREENSCREEN BENCHMARK™ SUMMARY

This product assessment report includes a GreenScreen Benchmark™ score and attached individual assessment reports for the product inventory listed in Table 1 and any impurities in Table 2 below.

The product itself has not been assigned a single Benchmark score. No product claims can be made without licensing through Clean Production Action.

Table 1. Product Benchmark Summary

Product Component(s)	Chemical Name	Trade Name or CASRN	% by weight in product	Benchmark Score	Assessment Report Number
Polymer Mixture	Various	EZ-Clean Paint, #EZ-50-BLK	85	**1**	GSA-23
Solvent	Chemical A	42123-45-8	1	**2**	GSA-43
Pigment	Chemical B	6472-81-2	8	**3**	GSA-876
	Chemical C	2976-34-2	6	**4**	GSA-88

Table 2. Impurities < 100 ppm: Special Case and Known

Chemical Name	CASRN	(ppm)	GreenScreen List Translator score	Function	Reason for Inclusion
Impurity 1	135-49-2	50	LT-UNK	Impurity	Special Case Impurity

Table 3. Weight Percentage of Product at Each Benchmark Score

1	2	3	4
85%	**1%**	**8%**	**6%**

PRODUCT FUNCTIONAL USE(S)

1) Paint
2) Coating

INVENTORY THRESHOLD

Inventory thresholds achieved and any deviations from GreenScreen requirements:
100 ppm (no deviation from v1.4 guidance)

Methods used to determine compliance with inventory thresholds:
Analytical testing (detection and quantification using HPLC; limit of detection 2.0 ppm)

Section IV — Assessing Chemicals with GreenScreen List Translator™

23. INTRODUCTION

A GreenScreen List Translator assessment is a streamlined chemical hazard assessment based on review of GreenScreen Specified Lists only. Authoritative and screening hazard lists can be very informative as a preliminary step to quickly identify known chemicals of high concern and to prioritize chemicals for further review. GreenScreen List Translator consolidates over 40 primary authoritative and screening sources and hundreds of sub-lists that include national and international regulatory and hazard lists, influential NGO lists of chemicals of concern (screening lists), lists from authoritative scientific bodies, European Risk and Hazard Phrases and chemical hazard classifications by countries using the Globally Harmonized System of Classification and Labelling of Chemicals.

All of the GreenScreen Specified Lists (Annex 11) used in GreenScreen have been compiled and subsequently mapped to hazard endpoints and hazard levels and published in the GreenScreen List Translator Map (Annex 12) and in the GreenScreen Chemical Hazard Criteria (Annex 1).

23.1 Method Limitations

GreenScreen List Translator only includes a review for presence or absence of a chemical on the GreenScreen Specified Lists. Since only a small fraction of chemicals in commerce have been reviewed by the organizations that publish these lists, a chemical's absence from a list does NOT mean that the chemical has a low hazard profile. A score of LT-UNK indicates a chemical was present on a GreenScreen Specified List, but the information contained within the list did not result in a clear mapping to a LT-1 or LT-P1 score. Thus, more research is needed to determine its hazard profile and whether it is a chemical of high concern.

GreenScreen List Translator does not include a data gap analysis. As such, a chemical with less data available may receive a more favorable score than a chemical that has been well studied and characterized. However, the risk of using the chemical of unknown hazard may be higher than using a chemical of known hazard depending on the hazard profile of the chemical.

GreenScreen List Translator does not include assessment of environmental transformation products, such as by-products of microbial action in sediment or waste treatment, chemical transformation in surface waters, or photochemical reactions in the atmosphere. A thoughtful follow-on process will consider the ramifications of this limitation.

To identify safer alternatives and make high impact choices, it is recommended to use a more comprehensive assessment leading to a GreenScreen Benchmark score.

24. LIST TRANSLATOR RESOURCES

While a GreenScreen List Translator assessment is included as one portion of the more comprehensive GreenScreen assessment, it can also be used as a standalone tool to screen for known chemicals of high concern in products. In addition to this guidance, the following resources[8] are needed to complete a List Translator assessment:

24.1 Annex 11 – GreenScreen Specified Lists

24.2 Annex 12 – GreenScreen List Translator™ Map

25. USES AND APPLICATIONS OF GREENSCREEN LIST TRANSLATOR

Using GreenScreen List Translator can be a first step toward a GreenScreen assessment and an affordable way to expedite the process of assessing the hazards of chemicals found in products. While it cannot substitute for a comprehensive GreenScreen assessment, there are still a variety of practical uses:

1) rapidly identifying LT-1 (Likely Benchmark-1) and LT-P1 (Possible Benchmark-1) chemicals when conducting an alternatives assessment,
2) earning LEED credit,[9]
3) prioritizing chemicals for further review and/or phase-out,
4) meeting client specifications for eliminating chemicals of very high concern,
5) assisting in regulatory and non-regulatory standard compliance, and
6) communicating materials goals and criteria to suppliers.

26. PROCESS OVERVIEW

GreenScreen List Translator maps GreenScreen Specified Lists to hazard endpoints, hazard levels and List Translator scores. The GreenScreen List Translator Map in Annex 12 documents this mapping, and is not a database of scores for specific chemicals (i.e. by CASRN). See Section 32 for automated tools that provide List Translator scores for chemicals of interest. The following table provides an overview of steps to evaluate chemicals using GreenScreen List Translator.

TABLE 4. **Quick Steps to Conduct a GreenScreen List Translator Assessment**

Step 1	Determine chemicals to assess
Step 2	Search GreenScreen Specified Lists (automated or manual search)
Step 3	Assess and classify hazards
Step 4	Determine List Translator score
Step 5	Report results: 1. List Translator score for each ingredient 2. List Translator Hazard Summary Table & lists 3. Resolution of any LT-P1 results

8 http://greenscreenchemicals.org/method/method-documents, accessed 12/15/17.
9 http://greenscreenchemicals.org/practice/leed, accessed 12/15/17.

27. STEP 1 – DETERMINE CHEMICALS TO ASSESS

The guidance in this Section IV applies to conducting a GreenScreen List Translator assessment for a single chemical identified by a CASRN.

28. STEP 2 – SEARCH GREENSCREEN SPECIFIED LISTS

The GreenScreen Specified Lists in Annex 11 contain web links to each list. Check each list for the presence of a chemical of interest. If a chemical is found on a list, compile the name(s) of the list(s) and the related list endpoint category. The GreenScreen Chemical Hazard Criteria in Annex 1 or the GreenScreen List Translator Map in Annex 12 can be used to determine which hazard endpoint(s) relate to the listing. This will be needed in later steps.

28.1 Individual versus Multiple Hazard Lists

In most GreenScreen Specified Lists, the listing category is specific to a single hazard endpoint. For example, several agencies have lists of carcinogens. While these carcinogens may also express other toxic properties, the source lists specifically address the individual Carcinogenicity endpoint. Chemicals with data for individual hazard endpoints will normally be assigned a hazard level such as very High, High, Moderate, or Low (See sub-section 29).

Some lists, however, address multiple hazard endpoints (e.g., lists of Persistent-Bioaccumulative-Toxic (PBT) chemicals or their equivalents). “Multiple Endpoints” are also indicated for many GHS classifications of Reproductive Toxicity. For an example, UNEP and EU GHS classifications often combine reproductive toxicity effects and developmental toxicity effects into a single endpoint called “Reproductive Toxicity.”

28.2 Authoritative versus Screening Lists

Authoritative Lists include results from hazard assessments by recognized experts, often as part of government regulatory processes. These results are considered to be highly reliable and should only be changed when new data or special circumstances clearly indicate that a new hazard level is warranted. Intervention of a Licensed GreenScreen Profiler or CPA’s Consulting Toxicologist would be required to validate such a change.

Screening Lists result in a classification with a lower level of confidence because at least one of the following is true of the list. It was:

1) developed using a less comprehensive review,
2) compiled by an organization that is not considered to be authoritative,
3) developed using predominantly or exclusively estimated data, or
4) developed to identify chemicals for further review and/or testing.

Regulatory prioritization screening lists are an example (e.g., Canada’s Domestic Substances List (DSL)). In the DSL program, quantitative structure-activity relationship models were used to fill in gaps in hazard data. These types of models have inherent error bounds and cannot produce results with the same reliability as good quality experimental data. See Table 5.

28.3 A-Sublists and B-Sublists

1) A-Sublists include data that give clear, focused hazard levels. Two situations occur:
   a. One hazard endpoint with only one possible hazard level (e.g., a US CDC occupational carcinogen can only lead to the result "High Concern" for Carcinogenicity), or
   b. A hazard classification with only one possible List Translator score (e.g., a chemical on the U.S. EPA Priority PBT list) will receive an LT-1. No other score is possible for substances on this list.
2) B-Sublists include data that cannot be captured in a single hazard level or single hazard endpoint. For example:
   a. The G&L list identifies neurotoxic chemicals; however, no assessment of the potency of the substances or severity of the effects is offered. Presence on the G&L list is therefore classified as a range of possible hazard levels, from very High to Moderate.
   b. Current UNEP and EU GHS classification schemes combine reproductive and developmental toxicity into a single endpoint. As such, an indication of hazard cannot always be separated into either Reproductive (R) or Developmental (D) Toxicity effects. Chemicals on these hazard lists may not translate into the individual R and D endpoints and instead be assessed against "Multiple" criteria that combine R and D.

TABLE 5. **Categorization of GreenScreen Specified List**

List Type	Description	Possible Combinations
Authoritative Lists	Authoritative lists are generated by recognized experts, often as part of a government regulatory process to identify chemicals and known associated hazards. These lists are considered to be of high reliability and should only be changed when new data or special circumstances clearly indicate that a new level-of-concern is warranted. Intervention of a Licensed GreenScreen Profiler or CPA's Consulting Toxicologist would be required to validate such a change.	Authoritative A*
		Authoritative B**
Screening Lists	Screening Lists result in a classification with a lower level of confidence because at least one of the following is true of the list. It was: 1. developed using a less comprehensive review, 2. compiled by an organization that is not considered to be authoritative, 3. developed using predominantly or exclusively estimated data, or 4. developed to identify chemicals for further review and/or testing.	Screening A*
		Screening B**

* A Sublists: This category in the list translates directly to one of the following: 1) a single hazard classification for a single GreenScreen Hazard Endpoint, or 2) a single Benchmark.

** B Sublists: Categories that meet one or more of the following: 1) This category in the list incorporates a single GreenScreen Hazard Endpoint and does not translate directly to a single Hazard Classification or Benchmark; AND/OR 2) This category in the list refers to more than one GreenScreen Hazard Endpoint; AND/OR 3) This category in the list specifies that the hazard is associated with a specific form of the substance or a specific exposure route.

28.4 Trumping rules

The GreenScreen Specified Lists carry inherent weighting based on the organization that publishes the list as well as the process used to develop the list. These factors are captured in the list type as explained in the list definitions in Table 5 above. When a specific hazard endpoint for a given chemical is found on more than one GreenScreen Specified List, one of the lists will drive the hazard classification by taking precedence over the other list(s).

The rules for selecting which list takes precedence over the other lists are depicted in Table 6 below. When the chemical shows up on more than one list for the same hazard endpoint, find the first list type in Column 1 and the second list type in Row 1. The rule found in the cell at the intersection of the two list types determines which list will control the hazard classification. Repeat this process for each hazard endpoint for which the chemical of interest appeared on more than one list.

For example, if one list is an Authoritative B list and the second is a Screening A list, then the Authoritative B list will "trump" the Screening A list and drive the hazard classification for the hazard endpoint. When a chemical shows up on more than two lists, the same procedure is used iteratively, beginning with the first two lists.

When a list results in a hazard range that spans only two hazard levels (e.g., H or M) as seen in the "Display in Hazard Box" column of the List Translator, use the highest end of the range (e.g., H) to determine whether a given list is most conservative. If the list results in a hazard range that spans more than two hazard levels, the hazard is classified as UNK. When a list results in a hazard level of UNK, the list is not used in the "trumping" process described above. However, if it is the only list for the hazard endpoint, place UNK in the Hazard Summary Table for that hazard endpoint.

TABLE 6. **Trumping Rules for GreenScreen Specified List**

	Column 1	Column 2	Column 3	Column 4	Column 5
Row 1		Authoritative A	Authoritative B	Screening A	Screening B
Row 2	Authoritative A	Most Convervative	Most Conservative	Authoritative A	Authoritative A
Row 3	Authoritative B		Most Conservative	Authoritative B	Authoritative B
Row 4	Screening A			Most Conservative	Most Conservative
Row 5	Screening B				Most Conservative

29. STEP 3 – ASSESS AND CLASSIFY HAZARDS – LIST TRANSLATOR

29.1 The hazard classification step in a List Translator assessment is based on hazard lists (i.e., GreenScreen Specified Lists) only. The GreenScreen List Translator method does not include data requirements to achieve a given List Translator score; however, GreenScreen assessments do have strict minimum data requirements for each Benchmark score.

29.2 The GreenScreen List Translator Map specifies the hazard endpoint(s) and hazard level(s) associated with each listing on a GreenScreen Specified List, as well as the List Translator score associated with each listing. The hazard levels are described in Table 7.

TABLE 7. **Description of Hazard Levels for List Translator**

Hazard Level Classification	
vH	Very High Concern
H	High Concern
M	Moderate Concern
L	Low Concern
vL	Very Low Concern
(BLANK)	The chemical was not found on any of the authoritative or screening lists associated with GreenScreen
Range	A range may be reported for chemicals found on "B" lists. B lists sometimes include a level of uncertainty and may benefit from additional research to confirm a more specific hazard classification level

* **Bold** font indicates result was derived from an Authoritative A list; *Italics* font indicates result was derived from Authoritative B, Screening A, or Screening B lists

29.3 Document Hazard Levels

In the Hazard Summary Table (See example in Table 8), indicate the hazard level assigned to each hazard endpoint. Display the hazard level in the Hazard Summary Table as it appears in the "Display in Hazard Box" column of the List Translator Map for the list that is driving the hazard score. The hazard levels and ranges in the List Translator Map were determined as follows:

1) Where a hazard range spans only 2 levels (e.g., H or M), the range is displayed in the Hazard Summary Table.
2) Where a hazard range spans more than 2 levels (e.g., H, M, or L), UNK is displayed in the Hazard Summary Table.
3) When a CASRN is found on a multiple endpoint list, "Mult" is displayed in the Multiple hazard box in the Hazard Summary Table. (See sub-section 28.1 – Individual versus Multiple Hazard Lists).

TABLE 8. **Example List Translator Hazard Summary Table**

Group I Human					Group II and II* Human									Ecotex		Fate		Physical		Climate Impact		Multiple
C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F	ODP	GWP	
						SINGLE	REPEATED*	SINGLE	REPEATED*													
			M or L	*H or M*	*L*	*vH*	*H*	*M*	*M or L*			*M*	*H*			*vH or H*			*H*	*NA*	*NA*	*Mult*

Glossary of GreenScreen® Hazard Endpoint Abbreviations

Group I Human:
C Carcinogenicity
M Mutagenicity
R Reproductive Toxicity
D Developmental Toxicity
E Endocrine activity

** Repeated exposure*

Group II and II* Human:
AT Acute mammalian toxicity
ST Systemic toxicity
N Neurotoxicity
SnS Skin sensitization
SnR Respiratory sensitization
IrS Skin irritation
IrE Eye irritation

Ecotox:
AA Acute aquatic toxicity
CA Chronic aquatic toxicity

Fate:
P Persistence
B Bioaccumulation

Physical:
Rx Reactivity
F Flammability

Climate Impact:
ODP Ozone Depletion Potential
GWP Global Warming Potential

30. STEP 4 – DETERMINE LIST TRANSLATOR SCORE

30.1 List Translator Score Description

Use List Translator score nomenclature only, and not GreenScreen Benchmark nomenclature, to communicate results from a GreenScreen List Translator assessment. There are only 3 possible List Translator scores. List Translator scores begin with LT (i.e., LT-1, LT-P1, LT-UNK) to clearly distinguish the scores from GreenScreen Benchmark scores. See Table 9 for List Translator scoring nomenclature and how each List Translator score is related to GreenScreen Benchmark scores.

Results reported as LT-P1 may be resolved by performing further research on the hazard endpoint(s) driving the LT-P1 score. Using this approach, there are only two possible resolved scores, either LT-1 or LT-UNK. See Table 9 for two approaches to resolve LT-P1 scores.

GreenScreen List Translator cannot be used to verify that a chemical is safe or even to say that it is safer than a Benchmark-1. A chemical that receives a List Translator score of LT-UNK may be a safer chemical; however, it may also be a chemical that has not been evaluated by the organizations publishing GreenScreen Specified Lists, or it may be a chemical that has not been well tested and has minimal data available (unknown hazard). Due to the more comprehensive nature of GreenScreen assessments, Benchmark scores always trump List Translator scores.

TABLE 9. **List Translator versus Benchmark Scores**

List Translator Score	GreenScreen Benchmark Equivalent	Derivation	Exceptions/Resolution
LT-1	Likely Benchmark-1	An LT-1 score is based on clear agreement among Authoritative lists that the substance is a Chemical of High Concern and may be considered equivalent to a GreenScreen Benchmark-1.	EXCEPTIONS: chemicals that are hazardous due to form-specific issues (e.g., silica, TiO2). RESOLUTION: The solution is to fully characterize the form (e.g., particle-size distribution, purity, etc.), and obtain a GreenScreen assessment to determine a Benchmark score.
LT-P1	Possible Benchmark-1	Frequently this means that the chemical appears on a list that does not translate directly to a single Benchmark score and Benchmark-1 is included in the range of possible Benchmark scores.	EXCEPTIONS: none RESOLUTION: It is an option to resolve LT-P1 scores to further support decision-making.[10] There are two ways to do so: 1. Evaluate only the Hazard Endpoints driving the LT-P1 score using guidance in Section I. (e.g., P, B and T): a. If it meets Benchmark-1 criteria, assign a score of LT-1. b. If it does not meet Benchmark-1 criteria, assign a score of LT-UNK. 2. Perform a GreenScreen assessment and report the final Benchmark score.
LT-UNK	Unknown Benchmark	LT-UNK ("unknown") indicates that a chemical is present on a GreenScreen Specified List but that there is insufficient information to classify the hazard as LT-1 or LT-P1. The LT-UNK score or the absence of a chemical on hazard lists does not mean it is safe. It may mean the chemical has not been reviewed by the body publishing the list or that the chemical has not yet been well tested.	A GreenScreen assessment would need to be performed to determine the Benchmark score of the chemical.

30.2 Assign a List Translator score

Assign each chemical a List Translator score based on the combination of the hazard levels and hazard endpoints as reported in the List Translator Hazard Summary Table. First determine a List Translator score based on individual endpoint hazard lists, then determine a List Translator score based on multiple endpoint lists. Assign the most conservative List Translator score.

To determine a List Translator score based on individual endpoint hazard lists, compare the Hazard Summary Table to the LT-1 criteria in Table 10 below. You can use Table 10 as a worksheet to determine whether one or more of the List Translator scoring criteria are met. If a hazard range spans only 2 hazard levels (e.g., H or M), use the most conservative hazard value (e.g., H) for scoring. When the hazard level is specified as UNK for a hazard endpoint(s), do NOT use the hazard endpoint(s) to assign a "Yes" for any scoring criteria.

10 Resolving LT-P1 scores is required for Option 2 of the LEED v4 Optimization credit (http://www.greenscreenchemicals.org/practice/leed), accessed 12/15/17.

TABLE 10. **List Translator Scoring Algorithm**

LT-1 Criteria	Answer (Y or N)	List Type(s)	Hazard Endpoint(s)
a. High Toxicity (Group I)			
b. High P **AND** High B **AND** very High Toxicity (Ecotox or Group II) **OR** High Toxicity (Group I or II*)			
c. very High P **AND** very High B			
d. very High P **AND** very High Toxicity (Ecotox or Group II) **OR** High Toxicity (Group I or II*)			
e. very High B **AND** very High Toxicity (Ecotox or Group II) **OR** High Toxicity (Group I or II*)]			

Human Health Group I: Carcinogenicity (C), Mutagenicity & Genotoxicity (M), Reproductive Toxicity (R), Developmental Toxicity including Neurodevelopmental Toxicity (D), and Endocrine Activity (E)

Human Health Group II: Acute Toxicity (AT), Systemic Toxicity & Organ Effects (ST-single), Neurotoxicity (N-single), Skin Irritation (IrS), and Eye Irritation (IrE)

Human Health Group II*: Systemic Toxicity & Organ Effects* Repeated Exposure (ST-repeated, Neurotoxicity – Repeated Exposure (N-repeated), Skin Sensitization (SnS) and Respiratory Sensitization (SnR)

Environmental Toxicity & Fate (Ecotox): Acute Aquatic Toxicity (AA), Chronic Aquatic Toxicity (CA), Other Ecotoxicity studies when available, Persistence (P), Bioaccumulation (B)

Physical Hazards: Reactivity (Rx), and Flammability (F)

30.2.1 Step 4a: LT-1 Criterion (a)

1) If one or more combinations of hazard endpoint and hazard level meet LT-1 Criterion (a), and the hazard level in at least one of those combinations is based on an Authoritative A list, the chemical score is LT-1. This is true even if other hazard levels are based on Authoritative B or Screening lists, as the most conservative listing (i.e. Authoritative A) drives the final score.
2) If one or more combinations of hazard endpoint and hazard level meet LT-1 Criterion (a), and all hazard levels are based on either Screening lists or Authoritative B lists, the chemical score is LT-P1.

30.2.2 Step 4b: LT-1 Criteria (b) through (e)

1) If the combination of hazard endpoints and hazard levels in the Hazard Summary Table results in meeting Criterion (b), (c), (d), or (e), and all are based on Authoritative A lists, the score is LT-1.
2) If the combination of hazard endpoints and hazard levels used to meet Criterion (b), (c), (d), or (e) were based on both Authoritative AND Screening lists, the score will be LT-P1.
3) If the combination of hazard endpoints and hazard levels used to meet Criterion (b), (c), (d), or (e) were all based on Screening A or B lists, the score will be LT-P1.

30.2.3 Step 4c: Multiple endpoint hazard lists

To assign a List Translator score from a multiple endpoint hazard list, use the List Translator score provided in the GreenScreen List Translator Map (Annex 12). Do not use the LT-1 criteria in Table 10. A List Translator score has already been assigned in Annex 12 based on an in-depth review of the underlying source list criteria and endpoints and application of the List Translator scoring criteria above. If the chemical is found on more than one multiple endpoint hazard list, assign the most conservative List Translator score.

30.2.4 Step 4d: Assign a final List ranslator score

Determine the final score for the chemical of interest based on the information from steps 4a-4c above by selecting the most conservative score. For example, if you assigned a score of LT-1 based on step 4a, an LT-UNK based on step 4b, and an LT-P1 based on step 4c, the final score for the chemical would be LT-1.

If all answers are "No" in the scoring algorithm, the score is LT-UNK. If the chemical of interest is not found on any of the GreenScreen Specified Lists, the chemical does not receive a List Translator score. The result should be communicated as "NoGSLT."[11]

31. STEP 5 – REPORT LIST TRANSLATOR RESULTS

31.1 Supporting Documentation

Each List Translator assessment should include, at a minimum:

1) Chemical Name and CASRN (can be redacted, as applicable),
2) List Translator score,
3) List Translator Hazard Summary Table, including lists where chemical is found, and
4) Explanation of resolution of any LT-P1 results.

31.2 Format

Depending on the end use of List Translator assessment, document findings using one of the following formats:

1) Health Product Declaration (HPD) Format[12]

   HPD Builder may be used to document a product's intentional ingredients, residuals, and hazards, as well as other information known about the product and the status of efforts for further disclosure.

2) Custom Format

   For proprietary ingredients, chemical name and CASRN may be withheld; however, report function, amount, resulting GreenScreen List Translator score, and hazards driving the score.

32. AUTOMATION OF GREENSCREEN LIST TRANSLATOR

Licensed GreenScreen List Translator Automators have developed automated tools that can be used to search for GreenScreen List Translator assessment results for a chemical of interest. Visit the Greenscreen website for a list of Licensed GreenScreen List Translator Automators and their tools.[13]

11 Note that some databases which incorporate both GreenScreen Benchmark scores and GreenScreen List Translator scores, such as the Health Product Declaration® (HPD) Builder, use "NoGS" to indicate there is no publicly available GreenScreen Benchmark score available for a given chemical, and the chemical has no GreenScreen List Translator score.

12 www.hpdcollaborative.org, accessed 12/15/17.

13 https://www.greenscreenchemicals.org/professionals/public-access-providers, accessed 12/15/17.

Section V — Annexes

SECTION V — ANNEX 1

GreenScreen Chemical Hazard Criteria™

GreenScreen Chemical Hazard Criteria

SINGLE HAZARD ENDPOINTS

Group I Human Health Effects (Group I Human)

TABLE A1.1: Carcinogenicity (C)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Carcinogenicity (C)	Data	GHS Criteria & Guidance		GHS Category 1A (Known) or 1B (Presumed) for any route of exposure	GHS Category 2 (Suspected) for any route of exposure or limited or marginal evidence of carcinogenicity in animals	· Adequate data available and negative studies; and · GHS not classified
	A Lists	US EPA – IRIS Carcinogens (1986)	Authoritative	Group A or B1 or B2	Group C	Group E
		US EPA – IRIS Carcinogens (1996, 1999, 2005)	Authoritative	Known or Likely		Not Likely
		EU – REACH Annex XVII CMRs	Authoritative	Category 1 or 2	Category 3	
		EU – Annex VI CMRs	Authoritative	Carc 1A or 1B	Carc 2	
		EU – GHS (H-Statements)	Authoritative	H350 or H350i	H351	
		EU – R-Phrases[1]	Authoritative	R45 or R49	R40	
		EU – SVHC Candidate List	Authoritative	Carcinogenic – Candidate list		
		EU – SVHC Prioritisation List	Authoritative	Carcinogenic – Prioritized for listing		
		EU – SVHC Authorisation List	Authoritative	Carcinogenic – Banned unless Authorised		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A or 1B or H350 or H350i	Category 2 or H351	Not Classified
		GHS – [NEW ZEALAND]	Screening	6.7A	6.7B	Not Classified
		IARC	Authoritative	Group 1 or 2a	Group 2b	Group 4
		MAK	Authoritative	Carcinogen Group 1 or 2	Carcinogen Group 3A or 3B or 4 or 5	
		US CDC – Occupational Carcinogens	Authoritative	Occupational Carcinogen		
		US NIH – Report on Carcinogens	Authoritative	Known or Reasonably Anticipated		
		CA EPA – Prop 65	Authoritative	Carcinogen		
	B Lists	US EPA – IRIS Carcinogens (1986)	Authoritative	Group D		
		US EPA – IRIS Carcinogens (1999)	Authoritative	Suggestive Evidence, but not sufficient to assess human carcinogenic potential		
		US EPA – IRIS Carcinogens (2005)	Authoritative	Suggestive evidence of carcinogenic potential		
		IARC	Authoritative	Group 3		
		CA EPA – Prop 65 (with qualifications)[2]	Authoritative	Carcinogen – specific to chemical form or exposure route		

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GreenScreen Chemical Hazard Criteria

TABLE A1.2: Mutagenicity/Genotoxicity (M)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Mutagenicity/Genotoxicity (M)	Data	GHS Criteria & Guidance		GHS Category 1A (Known) or 1B (Presumed) for any route of exposure	GHS Category 2 (Suspected) for any route of exposure or limited or marginal evidence of mutagenicity in animals	· Adequate data available and negative studies for both chromosomal aberrations and gene mutations; and · GHS not classified
	A Lists	EU – REACH Annex XVII CMRs	Authoritative	Category 1 or 2	Category 3	
		EU – Annex VI CMRs	Authoritative	Mutagen 1A or 1B	Mutagen 2	
		EU – GHS (H-Statements)	Authoritative	H340	H341	
		EU – R-Phrases[1]	Authoritative	R46	R68	
		EU – SVHC Candidate List	Authoritative	Mutagenic – Candidate list		
		EU – SVHC Prioritisation List	Authoritative	Mutagenic – Prioritized for listing		
		EU – SVHC Authorisation List	Authoritative	Mutagenic – Banned unless Authorised		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A or 1B or H340	Category 2 or H341	Not Classified
		GHS – [NEW ZEALAND]	Screening	6.6A	6.6B	Not Classified
	B Lists	MAK	Authoritative	Germ Cell Mutagen 1 or 2 or 3a		
		MAK	Authoritative	Germ Cell Mutagen 3b or 5		

TABLE A1.3: Reproductive Toxicity (R)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Reproductive Toxicity (R)	Data	GHS Criteria & Guidance Note: GHS Reproductive Toxicity includes both reproductive and developmental effects, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on reproductive effects alone.		GHS Category 1A (Known) or 1B (Presumed) for any route of exposure	GHS Category 2 (Suspected) for any route of exposure or limited or marginal evidence of reproductive toxicity in animals	· Adequate data available and negative studies; and · GHS not classified
	A Lists	EU – GHS (H-Statements)	Authoritative	H360F or H360FD or H360Fd	H360Df or H361f or H361fd	
		EU – R-Phrases[1]	Authoritative	R60	R62	
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A (Known) or Category 1B (Presumed) or H360F or H360FD or H360Fd	Category 2 (Suspected) or H360Df or H361f or H361fd	Not Classified for reproductive effects
		GHS – [NEW ZEALAND]	Screening	6.8A	6.8B	Not Classified for reproductive effects
		US NIH – Reproductive & Developmental Monographs	Authoritative	Clear Evidence of Adverse Effects – Reproductive		Clear Evidence of No Adverse Effects – Reproductive
		CA EPA – Prop 65	Authoritative	Reproductive Toxicity – Male or Female		
	B Lists	US NIH – Reproductive & Developmental Monographs	Authoritative	Limited Evidence of Adverse Effects – Reproductive or Some Evidence of Adverse Effects – Reproductive		
					Limited Evidence of No Adverse Effects – Reproductive or Some Evidence of No Adverse Effects – Reproductive	
				Insufficient Evidence for a Conclusion – Reproductive Toxicity		
		CA EPA – Prop 65 (with qualifications)[2]	Authoritative	Reproductive Toxicity – Male or Female		

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TABLE A1.4: Developmental Toxicity (D)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Developmental Toxicity (D)	Data	GHS Criteria & Guidance Note: GHS Reproductive Toxicity includes both reproductive and developmental effects, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on developmental effects alone.		GHS Category 1A (Known) or 1B (Presumed) for any route of exposure or effects on or via lactation	GHS Category 2 (Suspected) for any route of exposure or limited or marginal evidence of developmental toxicity in animals	· Adequate data available and negative studies; and · GHS not classified
	A Lists	EU – GHS (H-Statements)	Authoritative	H360FD or H360D or H360Df or H362	H360Fd or H361d or H361fd	
		EU – R-Phrases[1]	Authoritative	R61 or R64	R63	
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A or 1B or effects on or via lactation or H360FD or H360D or H360Df or H362	Category 2 or H360Fd or H361d or H361fd	Not Classified for developmental effects
		GHS – [NEW ZEALAND]	Screening	6.8A or 6.8C	6.8B	Not Classified for developmental effects
		US NIH – Reproductive & Developmental Monographs	Authoritative	Clear Evidence of Adverse Effects – Developmental		Clear Evidence of No Adverse Effects – Developmental
		CA EPA – Prop 65	Authoritative	Developmental toxicity		
	B Lists	G&L – Neurotoxic Chemicals	Screening	Developmental Neurotoxicant		
		Boyes – Neurotoxicants	Screening	Developmental Neurotoxicity		
		MAK	Authoritative	Pregnancy Risk Group A or B		
					Pregnancy Risk Group C	
				Pregnancy Risk Group D		
		US NIH – Reproductive & Developmental Monographs	Authoritative	Limited Evidence of Adverse Effects – Developmental or Some Evidence of Adverse Effects – Developmental		
					Limited Evidence of No Adverse Effects – Reproductive or Some Evidence of No Adverse Effects – Developmental	
				Insufficient Evidence for a Conclusion – Developmental Toxicity		
		CA EPA – Prop 65 (with qualifications)[2]	Authoritative	Developmental toxicity		

TABLE A1.5: Endocrine Activity (E)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Endocrine Activity (E)	Data	All Available Data		Evidence of endocrine activity and related human health effect	Evidence of endocrine activity	Adequate data available and negative studies
	A Lists	EU – Priority Endocrine Disrupters	Screening			Category 3a
		EU – SVHC Candidate List	Authoritative	Equivalent Concern – Candidate List: endocrine disrupting properties cause probable serious effects to the environment or human health		
		EU – SVHC Prioritisation List	Authoritative	Equivalent Concern – Prioritized for Listing: endocrine disrupting properties cause probable serious effects to the environment or human health		
		EU – SVHC Authorisation List	Authoritative	Equivalent Concern – Banned Unless Authorized: endocrine disrupting properties cause probable serious effects to the environment or human health		
	B Lists	EU – Priority Endocrine Disrupters	Screening	Category 1 or 2		
				Category 3b		
		OSPAR	Authoritative	Endocrine Disruptor – chemical for priority action		
		OSPAR	Screening	Endocrine Disruptor – substance of possible concern		
		ChemSec – SIN List	Screening	Endocrine Disruption		
		TEDX – Potential Endocrine Disruptors	Screening	Potential Endocrine Disruptor		

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SINGLE HAZARD ENDPOINTS
Group II and II* Human Health Effects (Group II and II* Human)

TABLE A1.6: Acute Mammalian Toxicity (AT)

	Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Acute Mammalian Toxicity (AT)	Data	GHS Criteria & Guidance		GHS Category 1 or 2 for any route of exposure	GHS Category 3 for any route of exposure	GHS Category 4 for any route of exposure	· GHS Category 5; or · Adequate data available and negative studies; and · GHS not classified
	Guidance Values for Animal Data (see GHS for further information)	Oral LD50 (mg/kg)		≤50	>50 – 300	>300 – 2000	>2000
		Dermal LD50 (mg/kg)		≤200	>200 – 1000	>1000 – 2000	>2000
		Inhalation – Gas or Vapor LC50(mg/L)		≤2	>2 – 10	>10 – 20	>20
		Inhalation – Dust/Mist/Fumes LC50 (mg/L)		≤0.5	>0.5 – 1.0	>1 – 5	>5
	A Lists	DOT[1]	Authoritative	Class 2.3 Group A, or Class 6.1 Group 1 or Group 2	Class 6.1 Group 3		
		EU – GHS (H-Statements)	Authoritative	H300 or H310 or H330	H301 or H311or H331	H302 or H312 or H332	
		EU – R-Phrases[1]	Authoritative	R26 or R27 or R28			
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1 or 2 or H300 or H310 or H330	Category 3 or H301 or H311 or H331	Category 4 or H302 or H312 or H332	Category 5 or H303 or H313 or H333 or Not Classified
		GHS – [NEW ZEALAND]	Screening	6.1A or 6.1B	6.1C	6.1D	6.1E or Not Classified
	B Lists	US EPA – EPCRA Extremely Hazardous Substances	Authoritative	Extremely Hazardous Substance			
		EU – R-Phrases	Authoritative			R20 or R21 or R22	
				R23 or R24 or R25			
		Québec CSST – WHMIS 1988	Screening	D1A Toxic			
				D1B Toxic			

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TABLE A1.7: **Systemic Toxicity/Organ Effects (ST)**

		Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Systemic Toxicity/Organ Effects (ST)	Single Exposure	Data Note: GHS includes neurotoxicity under Systemic Toxicity, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on any effects other than neurological/ neurobehavioral effects.	GHS Criteria & Guidance		GHS Category 1 Single Exposure for any route of exposure	GHS Category 2 Single Exposure for any route of exposure	GHS Category 3 Single Exposure for any route of exposure	· Adequate data available and negative studies; and · GHS not classified
		GHS Guidance Values for Animal Data (see GHS for further information) Note above applies here too.	Oral (mg/kg-bw)		≤300	>300 – 2000		
			Dermal (mg/kg-bw)		≤1000	>1000 – 2000		
			Inhalation-Gas or Vapor (mg/L/4h)		≤10	>10 – 20		
			Inhalation-Dust/Mist/Fumes (mg/L/4h)		≤1.0	>1.0 – 5.0		
		A Lists	EU – GHS (H-Statements)	Authoritative			H335	
			EU – R-Phrases[1]	Authoritative			R37	
			GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening			H335	
	Single Exposure - Aspiration Hazards	Data	GHS Criteria & Guidance			GHS Category 1	GHS Category 2	· Adequate data available and negative studies; and · GHS not classified
		A Lists	EU – GHS (H-Statements)	Authoritative		H304		
			EU – R-Phrases[1]	Authoritative		R65		
			GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening		Category 1 or H304	Category 2 or H305	"Not Classified"
		B Lists	GHS – [NEW ZEALAND]	Screening		6.1E		
	Repeated* Exposure	Data Note: GHS includes neurotoxicity under Systemic Toxicity, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on any effects other than neurological/neu-robehavioral effects.	GHS Criteria & Guidance			GHS Category 1 Repeated Exposure for any route of exposure	GHS Category 2 Repeated Exposure for any route of exposure	· Adequate data available and negative studies; and · GHS not classified
		GHS Guidance Values for Animal Data (see GHS for further information) Note above applies here too.	Oral (mg/kg-bw/day)			≤10	>10 – 100	>100
			Dermal (mg/kg-bw/day)			≤20	>20 – 200	>200
			Inhalation-Gas or Vapor (mg/L/6h/day)			≤0.2	>0.2 – 1.0	>1.0
			Inhalation-Dust/Mist/Fumes (mg/L/6h/day)			≤0.02	>0.02 – 0.2	>0.2
		A Lists	EU – SVHC Candidate List	Authoritative		Equivalent Concern – Candidate List		
			EU – SVHC Prioritisation List	Authoritative		Equivalent Concern – Prioritized for Listing		
			EU – SVHC Authorisation List	Authoritative		Equivalent Concern – Banned Unless Authorized		

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GreenScreen Chemical Hazard Criteria

TABLE A1.8: **Neurotoxicity (N)**

		Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Neurotoxicity (N)	Single Exposure	Data Note: GHS includes neurotoxicity under Systemic Toxicity, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on neurological/ neurobehavioral effects alone.	GHS Criteria Systemic Toxicity/ Organ Effects using USEPA Risk Assessment Guidance to define applicable neurotoxic effects.		GHS Category 1 Single Exposure for any route of exposure	GHS Category 2 Single Exposure for any route of exposure	GHS Category 3 Single Exposure for any route of exposure	· Adequate data available and negative studies; and · GHS not classified
		GHS Guidance Values for Animal Data (see GHS for further information). Note above applies here too	Oral (mg/kg-bw)		≤300	>300 – 2000		
			Dermal (mg/kg-bw)		≤1000	>1000 – 2000		
			Inhalation-Gas or Vapor (mg/L/4h)		≤10	>10 – 20		
			Inhalation-Dust/Mist/Fumes (mg/L/4h)		≤1.0	>1.0 – 5.0		
		B Lists	EU – GHS (H-Statements)	Authoritative			H336	
			EU – R-Phrases[1]	Authoritative			R67	
			GHS –[COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening			H336	
	Repeated* Exposure	Data Note: GHS includes neurotoxicity under Systemic Toxicity, while GreenScreen separates them into two distinct hazard endpoints. This classification must be based on neurological/ neurobehavioral effects alone.	GHS Criteria Systemic Toxicity/ Organ Effects using USEPA Risk Assessment Guidance to define applicable neurotoxic effects.			GHS Category 1 Repeated Exposure for any route of exposure	GHS Category 2 Repeated Exposure for any route of exposure	· Adequate data available and negative studies; and · GHS not classified
		GHS Guidance Values for Animal Data (see GHS for further information). Note above applies here too.	Oral (mg/kg-bw/day)			≤10	>10 – 100	>100
			Dermal (mg/kg-bw/day)			≤20	>20 – 200	>200
			Inhalation-Gas or Vapor (mg/L/6h/day)			≤0.2	>0.2 – 1.0	>1.0
			Inhalation-Dust/Mist/Fumes (mg/L/6h/day)			≤0.02	>0.02 – 0.2	>0.2
	Either	B Lists	Boyes – Neurotoxicants	Screening	Neurotoxic[3]			
			G&L – Neurotoxic Chemicals	Screening	Neurotoxic[3]			

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TABLE A1.9: Skin Sensitization (SnS*)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Skin Sensitization (SnS*)	Data	GHS Criteria & Guidance		GHS Category 1A (high frequency of occurrence)	GHS Category 1B (low to moderate frequency of occurrence)	· Adequate data available and negative studies; and · GHS not classified
	A Lists	GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A	Category 1B	Not Classified
	B Lists	MAK	Authoritative	Sensitizing Substance Sh – Danger of skin sensitization or Sah – Danger of airway & skin sensitization		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	H317		
		EU – GHS (H-Statements)	Authoritative	H317		
		EU – R-Phrases[1]	Authoritative	R43		
		GHS – [NEW ZEALAND]	Screening	6.5B		

TABLE A1.10: Respiratory Sensitization (SnR*)

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
Respiratory Sensitization (SnR*)	Data	GHS Criteria & Guidance		GHS Category 1A (high frequency of occurrence)	GHS Category 1B (low to moderate frequency of occurrence)	· Adequate data available and negative studies; and · GHS not classified
	A Lists	EU – SVHC Candidate List	Authoritative	Equivalent Concern – Candidate List: Respiratory sensitizing		
		EU – SVHC Prioritisation List	Authoritative	Equivalent Concern – Prioritized for Listing: Respiratory sensitizing		
		EU – SVHC Authorisation List	Authoritative	Equivalent Concern – Banned Unless Authorized: Respiratory sensitizing		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1A	Category 1B	Not Classified
	B Lists	MAK	Authoritative	Sensitizing Substance Sa – Danger of airway sensitization or Sah – Danger of airway & skin sensitization		
		AOEC – Asthmagens	Authoritative	Asthmagen (G)		
				Asthmagen (Rr) and/ or (Rs) and/or (Rrs)		
		EU – GHS (H-Statements)	Authoritative	H334		
		EU – R-Phrases[1]	Authoritative	R42		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	H334		
		GHS – [NEW ZEALAND]	Screening	6.5A		

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GreenScreen Chemical Hazard Criteria

TABLE A1.11: Skin Irritation (IrS)

	Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Skin Irritation (IrS)	Data	GHS Criteria & Guidance		GHS Category 1 (Corrosive)	GHS Category 2 (Irritant)	GHS Category 3 (Mild irritant)	· Adequate data available and negative studies; and · GHS not classified
	A Lists	EU – GHS (H-Statements)	Authoritative	H314	H315		
		EU – R-Phrases[1]	Authoritative	R34 or R35	R38		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1 or H314	Category 2 or H315	Category 3 or H316	Not Classified
		GHS – [NEW ZEALAND]	Screening	8.2A or 8.2B or 8.2C	6.3A	6.3B	Not Classified

TABLE A1.12: Eye Irritation (IrE)

	Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Eye Irritation (IrE)	Data	GHS Criteria & Guidance		GHS Category 1 (Irreversible)	GHS Category 2A (Irritating)	GHS Category 2B (Mildly irritating)	· Adequate data available and negative studies; and · GHS not classified
	A Lists	EU – GHS (H-Statements)	Authoritative	H318	H319	H320	
		EU – R-Phrases[1]	Authoritative	R41			
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1	Category 2A	Category 2B	Not Classified
		GHS – [NEW ZEALAND]	Screening	8.3A			Not Classified
	B Lists	EU – R-Phrases[1]	Authoritative		R36		
		GHS – [NEW ZEALAND]	Screening		6.4A		

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SINGLE HAZARD ENDPOINTS

Ecotoxicity (Ecotox)

TABLE A1.13: Acute Aquatic Toxicity (AA)

	Information Type	Measurement	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Acute Aquatic Toxicity (AA)	Data	GHS Criteria & Guidance		GHS Category 1	GHS Category 2	GHS Category 3	· Adequate data available and negative studies; and · GHS not classified
	Guidance Values (see GHS for further information)	LC50 or EC50 (mg/L)		≤1	>1 to 10	> 10 to 100	>100
	A Lists	EU – GHS (H-Statements)	Authoritative	H400			
		EU – R-Phrases[1]	Authoritative	R50			
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1 or H400	Category 2 or H401	Category 3 or H402	Not Classified
		GHS – [NEW ZEALAND]	Screening	9.1A			Not Classified
	B Lists	EU – R-Phrases[1]	Authoritative		R51 or R52		
		GHS – [NEW ZEALAND]	Screening		9.1D		

TABLE A1.14: Chronic Aquatic Toxicity (CA)

	Information Type	Measurement	Very High (vH)	High (H)	Moderate (M)	Low (L)
Chronic Aquatic Toxicity (CA)	Data	Guidance Value (mg/L)	≤0.1	>0.1 to 1.0	> 1.0 to 10	>10

TABLE A1.15: Persistence (P)

	Information Type	Media & Measurement	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)	Very Low (vL)
Persistence (P)	Data	Soil or Sediment		>180 or recalcitrant	>60 to 180	16 to 60	< 16 OR GHS "Rapid degradability"	Meets 10-day window in "Ready Biodegradation Test"
		(1/2 life in days OR Result)						
		Water		> 60 or recalcitrant	> 40 to 60	16 to 40	< 16 OR GHS "Rapid degradability"	Meets 10-day window in "Ready Biodegradation Test"
		(1/2 life in days OR Result)						
		Air		> 5 or recalcitrant	>2 to 5		< 2	
		(1/2 life in days OR Result)						
		Long-Range Environmental Transport			Evidence	Suggestive Evidence		
	B Lists	EC - CEPA DSL	Screening	Persistent				

TABLE A1.16: Bioaccumulation Potential (B)

	Information Type	Measurement		Very High (vH)	High (H)	Moderate (M)	Low (L)	Very Low (vL)
Bioaccumulation Potential (B)	Data	BAF		> 5000	> 1000 to 5000	> 500 to 1000	> 100 to 500	≤ 100
		(Bioaccumulation Factor)						
		BCF		> 5000	> 1000 to 5000	> 500 to 1000	> 100 to 500	≤ 100
		(Bioconcentration Factor)						
		Log Kow		> 5.0	> 4.5 to 5.0	> 4.0 to 4.5		≤ 4
		(Log octanol-water partition coefficient)						
		Monitoring Data			Evidence	Suggestive Evidence		
		(Presence in humans or wildlife)						
	A Lists	EC – CEPA DSL	Screening	Bioaccumulative				

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SINGLE HAZARD ENDPOINTS
Physical Hazards

TABLE A1.17: **Reactivity (Rx)**

	Information Type	Measurement	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)
Reactivity (Rx)	Data - GHS Criteria & Guidance	Explosives		GHS Unstable	GHS Division 1.1, 1.2, or 1.3	GHS Division 1.4 or 1.5	Division 1.6 or Adequate data available and GHS not classified
		Self-reactive Substances		GHS Type A or B	GHS Type C or D	GHS Type E or F	Type G or Adequate data available and GHS not classified
		Substances which on contact with water emit flammable gases		GHS Category 1	GHS Category 2	GHS Category 3	Adequate data available and GHS not classified
		Oxidizing Gases			GHS Category 1		Adequate data available and GHS not classified
		Oxidizing Liquids and Solids		GHS Category 1	GHS Category 2	GHS Category 3	Adequate data available and GHS not classified
		Organic Peroxides		GHS Type A or B	GHS Type C or D	GHS Type E or F	Type G or Adequate data available and GHS not classified
		Self-heating Substances			GHS Category 1	GHS Category 2	Adequate data available and GHS not classified
		Substances Corrosive to Metal				GHS Category 1	Adequate data available and GHS not classified
		Desensitized Explosives			GHS Category 1 or 2	GHS Category 3 or 4	Adequate data available and GHS not classified
	A Lists	DOT[1]	Authoritative		Class 1 Group 1.1, 1.2, or 1.3	Class 1 Group 1.4, 1.5, or 1.6	
					Class 4.2 Group 2	Class 4.2 Group 3	
				Class 4.3 Group 1	Class 4.3 Group 2	Class 4.3 Group 3	
				Class 5.1 Group 1	Class 5.1 Group 2	Class 5.1 Group 3	
				Class 5.2 Type B	Class 5.2 Type C or D	Class 5.2 Type E or F	Class 5.2 Type G
		EU – GHS (H-Statements)	Authoritative	H200, H240, H241, H260, H271, EU-H032	H201, H202, H203, H251, H270	H204, H205, H252, H290	
		EU – R-Phrases[1]	Authoritative	R09, R32			
		GHS – [NEW ZEALAND]	Screening	4.1.2A or 4.1.2B or 4.3A or 5.1.1A or 5.2A or 5.2B	1.1 or 1.2 or 1.3, or 4.1.2C or 4.1.2D, 4.2B, or 4.3B, or 5.1.2A, or 5.1.1B, or 5.2C or 5.2D	1.4 or 1.5, or 4.1.2E or 4.1.2F, or 4.2C, or 4.3C, or 5.1.1C, or 5.2E or 5.2F, 8.1A	1.6, 4.1.2G, or 5.2G
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	See GreenScreen List Translator Map in Annex 12			
	B Lists	DOT[1]	Authoritative	Class 4.1, Class 5.2 Type A			
		EU – GHS (H-Statements)	Authoritative	EU-H029, EU-H031			
					H261, H272		
				H242			
		EU – R-Phrases[1]	Authoritative	R29, R31			
				R01, R06, R07, R15			
				R02, R04, R05, R08, R14, R16, R19, R44			
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	H242			
					H206, H207, H261, H272		
		Québec CSST – WHMIS 1988	Screening	B6, C, or F			

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TABLE A1.18: Flammability (F)

	Information Type	Measurement		Very High (vH)	High (H)	Moderate (M)	Low (L)
Flammability (F)	Data – GHS Criteria & Guidance	Flammable Liquid		GHS Category 1	GHS Category 2	GHS Category 3 or 4	Adequate data available and GHS not classified
		Flammable Gases (including pyrophoric gases and chemically unstable gases)		GHS Category 1A, or pyrophoric gas, or chemically unstable gas	GHS Category 1B	GHS Category 2	Adequate data available and GHS not classified
		Flammable Solids			GHS Category 1	GHS Category 2	Adequate data available and GHS not classified
		Aerosols			GHS Category 1	GHS Category 2	GHS Category 3 or Adequate data available and GHS not classified
		Pyrophoric Liquids			GHS Category 1		Adequate data available and GHS not classified
		Pyrophoric Solids			GHS Category 1		Adequate data available and GHS not classified
	A Lists	DOT[1]	Authoritative	Class 3 Group 1	Class 3 Group 2 or Class 4.2 Group 1	Class 3 Group 3	
		EU – GHS (H-Statements)	Authoritative	H220, H224, H230, H231	H222, H225, H250	H223, H226, H227	
		EU – R-Phrases[1]	Authoritative		R17		
		Québec CSST – WHMIS 1988	Screening		B1	B3	
		GHS – [NEW ZEALAND]	Screening	3.1A	3.1B, or 4.1.1A or 4.2A	2.1.1B or 3.1C or 3.1D, or 4.1.1B	
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	See GreenScreen List Translator Map in Annex 12			
	B Lists	DOT[1]	Authoritative		Class 2.1		
		EU – GHS (H-Statements)	Authoritative		H221, H228		
		EU – R-Phrases[1]	Authoritative	R10 (Gas or Solid), R11 (Solid)			
				R10 (Liquid only)			
				R11 (Liquid only)			
					R12 (Gas only)		
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening		H221, H228		
		GHS – [NEW ZEALAND]	Screening	2.1.1A, 2.1.2A			
		Québec CSST – WHMIS 1988	Authoritative		B4 or B5		
				B2			

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TABLE A1.19: Ozone Depletion Potential (ODP)

Ozone Depletion Potential (ODP)	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
	Data	*Ozone-Depletion Potential* (ODP) value relative to CFC-11		≥ 0.20	0.02 - 0.199	< 0.02
	A Lists	Montreal Protocol	Authoritative	Annex A, B, C & E (all Groups)		
		U.S. EPA ODS	Authoritative	ODS Class I & II		
		EU – EC No 1005/2009	Authoritative	ANNEX I & II		
		EU – GHS (H-Statements) or CLP (EUH Statements)	Authoritative	H420, EUH059		

TABLE A1.20: Global Warming Potential (GWP)

Global Warming Potential (GWP)	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)
	Data	*100-year Global-Warming Potential* (GWP100)		≥ 2500	100 –2499	< 100

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GreenScreen Chemical Hazard Criteria

MULTIPLE HAZARD ENDPOINTS

TABLE A1.21: Carcinogens, Mutagens, Reproductive Toxins (CMR)

	Information Type	Information Source	List Category	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
Carcinogens, Mutagens, Reproductive Toxins (CMR)	A Lists	ChemSec – SIN List	CMR – Carcinogen, Mutagen &/or Reproductive Toxicant	Screening				P1	One or more of the following: Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity.

TABLE A1.22: Reproductive and/or Developmental Toxicity

	Information Type	Information Source	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
Reproductive and/or Developmental Toxicity	A Lists	EU – R-Phrases[1]	Authoritative	R60/61 "May impair fertility" and "May cause harm to the unborn child"			1	Reproductive and Developmental Toxicity
	B Lists	EU – REACH Annex XVII CMRs	Authoritative	Toxic to Reproduction Category 1 – Substances known to impair fertility or cause Developmental Toxicity in humans			1	Reproductive and/or Developmental Toxicity
			Authoritative	Toxic to Reproduction Category 2 – Substances which should be regarded as if they impair fertility or cause Developmental Toxicity in humans			1	
			Authoritative		Reproduction Category 3 – possible		UNK	
		EU – Annex VI CMRs	Authoritative	Reproductive Toxicity 1A			1	
			Authoritative	Reproductive Toxicity 1B			1	
			Authoritative		Reproductive Toxicity – Category 2		UNK	
		EU – GHS (H-Statements)	Authoritative	H360 (with no letters) "May damage fertility or the unborn child <state specific effect if known > <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard >."			1	
			Authoritative		H361 (with no letters) "Suspected of damaging fertility or the unborn child <state specific effect if known> <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>."		UNK	
		EU – SVHC Candidate List	Authoritative	Toxic to reproduction – Candidate list			1	
		EU – SVHC Prioritisation List	Authoritative	Toxic to reproduction – Prioritized for listing			1	
		EU – SVHC Authorisation List	Authoritative	Toxic to reproduction – Banned unless Authorised			1	

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TABLE A1.23: Systemic Toxicity/Organ Effects and/or Neurotoxicity

		Information Type	Information Source	List Type	Very High (vH)	High (H)	Moderate (M)	Low (L)	LT Score
Systemic Toxicity/Organ Effects and/or Neurotoxicity	Single Exposure	A Lists	EU – GHS (H-Statements)	Authoritative	H370	H371			LT-UNK
			EU – R-Phrases[1]	Authoritative	R39 or R39/23 or R39/24 or R39/25 or R39/26 or R39/27 or R39/28	R68/20 or R68/21 or R68/22			LT-UNK
			GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening	Category 1 or H370	Category 2 or H371	Category 3	Not Classified	LT-UNK
			GHS – [NEW ZEALAND]	Screening	6.9A	6.9B		Not Classified	LT-UNK
	Repeated* Exposure	A Lists	EU – GHS (H-Statements)	Authoritative		H372	H373		LT-UNK
			EU – R-Phrases[1]	Authoritative		R48/23 or R48/24 or R48/25	R33 or R48/20 or R48/21 or R48/22		LT-UNK
			GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Screening		Category 1 or H372	Category 2 or H373	Not Classified	LT-UNK
			GHS – [NEW ZEALAND]	Screening		6.9A	6.9B	Not Classified	LT-UNK
		B Lists	EU – R-Phrases[1]	Authoritative		R48 – Danger of serious damage to health by prolonged exposure			LT-UNK

TABLE A1.24: Various Combinations of Group I, II and II* Human Health Endpoints

	Information Type	Information Source	List Category	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
Various Combinations of Group I, II and II* Endpoints	B Lists	EC – CEPA DSL	Inherently Toxic to Humans (iT human)	Screening				UNK	One or more of the following Human Health Effects: Carcinogenicity, Mutagenicity/ Genotoxicity, Reproductive Toxicity, Developmental Toxicity, Acute Mammalian Toxicity, System Toxicity/Organ Effects.
		MAK		Authoritative	Sensitizing Substance Sah – Danger of airway & skin sensitization			UNK	Respiratory and Skin Sensitization
				Authoritative	Sensitizing Substance SP – Danger of photo-contact sensitization			UNK	Skin and/or Respiratory Sensitization
		Québec CSST – WHMIS 1988	D2A and D2B Toxic and Very Toxic – With other effects	Screening				UNK	One or more of the following Chronic Human Health Effects: Carcinogenicity, Mutagenicity/ Genotoxicity, Reproductive Toxicity, Developmental Toxicity, Skin Sensitization, Respiratory Sensitization, Systemic Toxicity/ Organ Effects, Eye Irritation, Skin Irritation.
			E Corrosive	Screening				UNK	Reactivity and/or Eye Irritation/Corrosivity and/or Skin Irritation/Corrosivity

TABLE A1.25: **PBTs, vPvBs and other combinations of Persistence, Bioaccumulation and Toxicity**

PBTs, vPvBs and other combinations of Persistence, Bioaccumulation and Toxicity

Information Type	Information Source	List Category	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
A Lists	EC – CEPA DSL	Persistent, Bioaccumulative and inherently Toxic (PBiTH) to humans	Screening				P1	PBT [Persistence, Bioaccumulation and Human Toxicity (Human Health Effects)]
		Persistent, Bioaccumulative and inherently Toxic (PBiTE) to the Environment (based on aquatic organisms)	Screening				P1	PBT [Persistence, Bioaccumulation, and Acute Aquatic Toxicity or Chronic Aquatic Toxicity
	EU – ESIS PBT	vPvB	Screening				P1	vPvB [Persistence, Bioaccumulation]
		PBT	Screening				P1	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]
		POP	Screening				P1	Persistent Organic Pollutant [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]
	EU – SVHC Candidate List	PBT – Candidate list	Authoritative				1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]
		vPvB – Candidate list	Authoritative				1	vPvB [Persistence, Bioaccumulation]
	EU – SVHC Prioritisation List	PBT – Prioritized for listing	Authoritative				1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]
		vPvB – Prioritized for listing	Authoritative				1	vPvB [Persistence, Bioaccumulation]
	EU – SVHC Authorisation List	PBT – Banned unless Authorised	Authoritative				1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]
		vPvB – Banned unless Authorised	Authoritative				1	vPvB [Persistence, Bioaccumulation]
	US EPA – Priority PBTs (NWMP)	Priority PBT	Authoritative				1	PBT [Persistence, Bioaccumulation and any of the following: Ecotox and/or Human Toxicity (Human Health Effects)]
	OR DEQ – Priority Persistent Pollutants	Priority Persistent Pollutant – Tier 1 and Tier 2	Screening				P1	PBT [Persistence, Bioaccumulation and any of the following: Ecotox and/or Human Toxicity (Human Health Effects)]
	OSPAR	PBT – substance of possible concern	Screening				P1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/Organ Effects repeated exposure)]
		PBT – chemical for priority action	Authoritative				1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/Organ Effects repeated exposure)]
		Equivalent Concern – substance of possible concern	Screening				P1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/Organ Effects repeated exposure)]
		Equivalent Concern – chemical for priority action	Authoritative				P1	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/Organ Effects repeated exposure)]
	ChemSec – SIN List	vPvB	Screening				P1	Persistence and Bioaccumulation
		PBT	Screening				P1	Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)
	UNEP Stockholm Conv – Persistent Organic Pollutants	Priority POP	Authoritative				1	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]
	US EPA – Toxics Release Inventory PBTs	PBT	Authoritative				1	PBT [Persistence, Bioaccumulation, and Acute Aquatic Toxicity]
	WA DoE – PBT	PBT	Screening				P1	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]

CONTINUED

TABLE A1.25: **PBTs, vPvBs and other combinations of Persistence, Bioaccumulation and Toxicity** CONTINUED

	Information Type	Information Source	List Category	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
PBTs, vPvBs and other combinations of Persistence, Bioaccumulation and Toxicity	B Lists	EC – CEPA Toxic Substances (Sched 1)	CEPA Toxic	Screening				UNK	One or more of the following: Human Health Effects, Ecotoxicity, and/or Fate endpoints.
		EC – CEPA DSL	Inherently Toxic to the Environment (iT environment)	Screening				UNK	Acute Aquatic Toxicity or Chronic Aquatic Toxicity
		EU – GHS (H-Statements)	H410 – Very toxic to aquatic life with long lasting effects	Authoritative				P1	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]
			H411 – Toxic to aquatic life with long lasting effects	Authoritative				P1	
			H412 – Harmful to aquatic life with long lasting effects	Authoritative				UNK	
			H413 – May cause long-lasting harmful effects to aquatic life	Authoritative				UNK	
		EU – R-Phrases[1]	R50/53 – Very Toxic to Aquatic Organisms, May cause long-term adverse effects in the aquatic environment	Authoritative				P1	
			R51/53 – Toxic to Aquatic Organ-isms, May cause long-term adverse effects in the aquatic environment	Authoritative				P1	
			R52/53 – Harmful to Aquatic Organisms, May cause long-term adverse effects in the aquatic environment	Authoritative				UNK	
			R53 – May cause long-term adverse effects in the aquatic environment	Authoritative				UNK	
		GHS – [COUNTRY] Lists (Australia, Indonesia, Japan, Korea, Malaysia, Taiwan and Thailand)	Category 1 or H410	Screening				P1	
			Category 2 or H411	Screening				P1	
			Category 3 or H412	Screening				UNK	
			Category 4 or H413	Screening				UNK	
		GHS – [NEW ZEALAND]	9.1A	Screening				P1	
			9.1B	Screening				P1	
			9.1C	Screening				UNK	
			9.1D	Screening				UNK	
		German FEA – Substances Hazardous to Waters	Class 1 – Low Hazard to Waters	Screening				UNK	Any combination of the following: Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects, Carcinogenicity, Reproductive Toxicity, Developmental Toxicity, Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Persistence, Bioaccumulation.
			Class 2 – Hazard to Waters	Screening				P1	
			Class 3 – Severe Hazard to Waters	Screening				P1	

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TABLE A1.26: Reactivity and/or Flammability

	Information Type	Information Source	List Category	List Type	High (H)	Moderate (M)	Low (L)	LT Score	Hazard Endpoints Addressed
Reactivity and/or Flammability	B Lists	EU – R-Phrases[1]	R12 – Extremely Flammable Liquid	Authoritative				UNK	Reactivity and/or Flammability
			R03 – Extreme risk of explosion by shock, friction, fire or other sources of ignition	Authoritative				UNK	
			R18 – In use, may form flammable/explosive vapour-air mixture	Authoritative				UNK	
			R30 – Can become highly flammable in use	Authoritative				UNK	

1 List is considered an information source and is used as a line of evidence to classify a hazard in a GreenScreen assessment. List is not considered a GreenScreen Specified List and is not required to be searched for a GreenScreen List Translator assessment. See Annex 10 Information Sources.

2 See Annex 11 GreenScreen Specified Lists for more information about these lists.

3 List includes consideration of both acute and chronic neurotoxic impacts. To facilitate List Translator scoring, hazards are considered under the repeated exposure sub-endpoint. This does not impact List Translator scoring, as the list can only be translated to a range of hazard levels resulting in an "UNK" designation.

4 If a country does not designate between Category 1A and Category 1B for evaluating Skin or Respiratory Sensitization, then the list should be treated as a Screening B list, with a High to Moderate hazard level in GreenScreen for GHS Category 1 classifications.

SECTION V — ANNEX 2

GreenScreen Hazard Endpoint Classification Guidance

GreenScreen Hazard Endpoint Classification Guidanc

A2.1 GreenScreen Hazard Endpoints

There are 20 GreenScreen Hazard Endpoints—Human Health, Environmental Toxicity, Fate, Physical Hazard Endpoints, and Climate Impacts—that must be evaluated for each chemical. The endpoints are grouped as shown in Table A2.1 below. This Annex outlines supplementary guidance for classifying the hazard level for Reproductive Toxicity, Developmental Toxicity, Endocrine Activity, Systemic Toxicity, and Climate Impact endpoints only.

Group I Human Health endpoints reflect priorities that are consistent with national and international governmental regulations, and cover hazards that can lead to chronic or life-threatening effects or adverse impacts that are potentially induced at low doses and transferred between generations. They are built on international and national criteria for identifying chemicals with hazardous properties of high concern.

Group II and II* Human Health endpoints reflect hazards that are also important for understanding and classifying chemicals. Typically, Group II hazards may be mitigated. Group II and II* are differentiated from one another in the Benchmarking system because Group II endpoints have 4 hazard levels (i.e., vH, H, M and L) while Group II* endpoints have 3 hazard levels (i.e., H, M and L) and are evaluated based on repeated exposure.

Environmental Toxicity and Fate endpoints include Acute and Chronic Aquatic Toxicity, Persistence and Bioaccumulation potential. Additional Ecotoxicity endpoints such as Avian or Bee Toxicity may be included when data are available and the endpoints are relevant.[1]

Physical hazard endpoints include Flammability and Reactivity and are based on GHS criteria.

Climate Impact hazard endpoints include Ozone Depletion Potential (ODP) and Global Warming Potential (GWP). Note that for the purposes of v1.5, these 2 endpoints are reviewed and receive hazard classifications, but the classifications do not affect the final List Translator or Benchmark score.

1 Refer to EPA's Design for the Environment (DfE) Program Alternatives Assessment Criteria for Hazard Evaluation, Office of Pollution Prevention & Toxics, U.S. Environmental Protection Agency (Version 2.0, August 2011); http://www.epa.gov/sites/production/files/2014-01/documents/aa_criteria_v2.pdf, accessed 12/5/17.

TABLE A2.1: **Groupings of GreenScreen Hazard Endpoints**

Human Health Group I	Human Health Group II	Human Health Group II*	Environmental Toxicity & Fate	Physical Hazards	Climate Impacts
Carcinogenicity (C)	Acute Mammalian Toxicity (AT)	Systemic Toxicity & Organ Effects – Repeated Exposure sub-endpoint (ST-repeated)	Acute Aquatic Toxicity (AA)	Reactivity (Rx)	Ozone Depletion Potential (ODP)
Mutagenicity & Genotoxicity (M)	Systemic Toxicity & Organ Effects (ST-single)	Neurotoxicity – Repeated Exposure sub-endpoint (N-repeated)	Chronic Aquatic Toxicity (CA)	Flammability (F)	Global Warming Potential (GWP)
Reproductive Toxicity (R)	Neurotoxicity (N-single)	Skin Sensitization (SnS)	Other Ecotoxicity studies when available		
		Respiratory Sensitization (SnR)			
Developmental Toxicity including Neurodevelop-mental Toxicity (D)	Skin Irritation (IrS)		Persistence (P)		
	Eye Irritation (IrE)		Bioaccumulation (B)		
Endocrine Activity (E)					

A2.2 Hazard Classification Guidance

The following endpoint-specific guidance should be followed in conjunction with the GreenScreen Chemical Hazard Criteria in Annex 1 to assign hazard levels for the endpoints indicated.

A2.2.1 Reproductive and Developmental Toxicity

Reproductive and Developmental Toxicity are separate endpoints in GreenScreen. If a study includes both reproductive and developmental effects, they should be evaluated and reported in the respective section of the GreenScreen assessment. Effects on or via lactation are included under Developmental Toxicity. Although presence of data indicating effects on or via lactation must be reported and considered in the assessment, lack of negative data for effects on or via lactation does not result in a Data Gap.

A2.2.2 Endocrine Activity

A preliminary hazard level or range is assigned by determining whether the chemical is endocrine active. This is done by searching all GreenScreen Specified Lists and available data. For chemicals that are endocrine active, determine whether there is a plausibly related adverse human health effect, and identify the associated level of hazard. Assigning the final hazard level for Endocrine Activity will use expert judgment and a strength of evidence approach.[1]

A2.2.2.1 Low Hazard

1. Low hazard classification requires data for multiple endocrine pathways. Negative data on at least the following five pathways is required to assign a low hazard classification for endocrine activity: androgenicity, anti-androgenicity, thyroid effects, estrogenicity, and anti-estrogenicity.

A2.2.2.2 Moderate Hazard

1. Endocrine Activity is classified as Moderate if there is indication of Endocrine Activity in the scientific literature.

1 The science associated with testing for endocrine activity and associated adverse effects continues to evolve rapidly and will be incorporated into future revisions of GreenScreen.

a. All chemicals with data suggesting Endocrine Activity associated with adverse effects are initially assigned as Moderate. It is also acceptable to assign a range (Moderate or High) to indicate preliminary classification.

b. For chemicals listed on GreenScreen Specified Lists for Endocrine Activity, other than EU – SVHC Authorisation List, classify them initially as Moderate. It is also acceptable to assign a range (Moderate or High) to indicate preliminary classification.

c. Chemicals initially classified as Moderate using GreenScreen Specified Lists should be further reviewed using the scientific literature to confirm classification.

A2.2.2.3 High Hazard

1. If the chemical being assessed is present on the EU – SVHC Authorization List for Endocrine Activity, classify it as High hazard for Endocrine Activity.
2. Where Endocrine activity is plausibly[2] related to an adverse effect such as Carcinogenicity, Reproductive Toxicity, Developmental Toxicity and/or Systemic Toxicity (Repeated dose, typically, thyroid) and the hazard endpoint for the plausibly related adverse effect has been classified as High or very High, modify the hazard level for Endocrine Activity from Moderate to High. Where the adverse effect is not plausibly related or the hazard endpoint for the plausibly related adverse effect has been classified as Moderate, do not modify the Endocrine Activity level. See Table A2.2.

TABLE A2.2: **Modified Endocrine Activity Classifications for Select Endpoin**

Endpoint	Initial Endocrine Activity Classificatio	Plausibly Related Hazard Endpoint Classificatio	Modified Endocrine Activity Classificatio
Carcinogenicity	M	H	H
Carcinogenicity	M	M	M
Reproductive Toxicity	M	H	H
Reproductive Toxicity	M	M	M
Developmental Toxicity	M	H	H
Developmental Toxicity	M	M	M
Systemic Toxicity—repeated dose (Thyroid)	M	vH	H
Systemic Toxicity—repeated dose (Thyroid)	M	H	H
Systemic Toxicity—single dose (Thyroid)	M	M	M

A2.2.2.4 Data Gaps

1. A chemical that is not listed on any GreenScreen Specified Lists for Endocrine Activity and for which test data do not exist shall be assigned Data Gap.
2. Data Gaps are assigned using expert judgment: 1) if there is no evidence of Endocrine Activity, but data are incomplete for one or more of the five required endocrine mediated pathway, and/or 2) when a study demonstrating Endocrine Activity is judged to be inadequate.

2 Plausibly related means that the adverse effect is likely to be due to the endocrine mode of action. For example, an increase in T3 along with thyroid tumors would be plausibly related, but an increase in T3 would have no obvious connection to a skin cancer.

A2.2.3 Systemic Toxicity/Organ Effects and Neurotoxicity

These two endpoints can belong in either Group II or Group II* depending on whether the data are generated from single exposure (acute) or repeated exposure (sub-chronic or chronic) studies. Results from single and repeated exposures are not considered as separate endpoints but rather sub-endpoints.

A2.2.3.1 When classifying hazard for Systemic Toxicity/Organ Effects and Neurotoxicity endpoints, repeated exposure results are required. Lacking repeated exposure data results in a Data Gap.

A2.2.3.2 If data from both single and repeated exposure studies are available, then both hazard classifications shall be included in the GreenScreen Hazard Summary Table and the more conservative value will drive the hazard classification Benchmark score. If the less conservative value is used, include the rationale for why it was chosen in the assessment report.

A2.2.3.3 Lacking single exposure data, including data for aspiration hazards, does not result in a Data Gap when repeated exposure data are available. Enter the repeated exposure hazard classification in the GreenScreen Hazard Summary Table and shade out the single exposure sub-endpoint cell.

A2.2.3.4 If single exposure data are available for both systemic toxicity/organ effects generally and aspiration hazards specifically, use the most conservative value to fill in the Hazard Summary Table for Systemic Toxicity/Organ Effects – single exposure.

A2.2.4 Climatic Impacts – Ozone-Depletion Potential (ODP) and Global Warming Potential (GWP)

Climatic Impact endpoints address a chemical's capacity to alter Earth's radiative balance or stratospheric ozone layer. The new hazard endpoints only apply to substances that are gases or vapors under normal handling conditions; non-volatile liquids and solids are not relevant for ODP or GWP and therefore not evaluated.

A2.2.4.1 **"Not-Applicable (NA)" Substances** – If the substance is not a gas or vapor under normal conditions, record "NA" for both endpoints in the Hazard Summary Table and shade the cells grey.

A2.2.4.2 **Data Gap – Assign DG when:**

a. the chemical is a gas/vapor, and

b. the chemical is not on any of the specified ODP/GWP lists, and

c. quantitative data does not exist for assessment.

SECTION V — ANNEX 3

GreenScreen Benchmark Criteria for Organic Chemicals

Benchmark Criteria for Organic Chemicals

ABBREVIATIONS

- **P** Persistence
- **B** Bioaccumulation
- **T** Human Toxicity and Ecotoxicity

GREENSCREEN BENCHMARK–4

Low P + Low B + Low T (Ecotoxicity, Group I, II and II* Human) + Low Physical Hazards (Flammability and Reactivity) + Low (additional ecotoxicity endpoints when available)

Prefer—Safer Chemical

GREENSCREEN BENCHMARK–3

a. Moderate P or Moderate B
b. Moderate Ecotoxicity
c. Moderate T (Group II or II* Human)
d. Moderate Flammability or Moderate Reactivity

Use but Still Opportunity for Improvement

GREENSCREEN BENCHMARK–2

a. Moderate P + Moderate B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
b. High P + High B
c. High P + Moderate T (Ecotoxicity or Group I, II, or II* Human)
d. High B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
e. Moderate T (Group I Human)
f. Very High T (Ecotoxicity or Group II Human) or High T (Group II* Human)
g. High Flammability or High Reactivity

Use but Search for Safer Substitutes

GREENSCREEN BENCHMARK–1

a. PBT = High P + High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
b. vPvB = very High P + very High B
c. vPT = very High P + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
d. vBT = very High B + [very High T (Ecotoxicity or Group II Human) or High T (Group I or II* Human)]
e. High T (Group I Human)

Avoid—Chemical of High Concern

GREENSCREEN BENCHMARK–U

Unspecified Due to Insufficient Data

See Section 11.6 for instructions.

Group I Human includes Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive Toxicity, Developmental Toxicity (incl. Developmental Neurotoxicity), and Endocrine Activity. **Group II Human** includes Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects-Single Exposure, Neurotoxicity-Single Exposure, Eye Irritation and Skin Irritation. **Group II* Human** includes Systemic Toxicity/Organ Effects-Repeated Exposure, Neurotoxicity-Repeated Exposure, Respiratory Sensitization, and Skin Sensitization. Immune System Effects are included in Systemic Toxicity/Organ Effects. **Ecotoxicity** includes Acute Aquatic Toxicity and Chronic Aquatic Toxicity.

* For inorganic chemicals, see "Annex 4: Benchmark Criteria for Inorganic Chemicals."

SECTION V — ANNEX 4

GreenScreen Benchmark Criteria for Inorganic Chemicals

Benchmark Criteria for Inorganic Chemicals

ABBREVIATIONS

- **P** Persistence
- **B** Bioaccumulation
- **T** Human Toxicity and Ecotoxicity

GREENSCREEN BENCHMARK–4

Low B + Low T (Ecotoxicity, Group I, II and II* Human) +
Low Physical Hazards (Flammability and Reactivity) + Low (additional ecotoxicity endpoints when available)

Prefer—Safer Chemical

GREENSCREEN BENCHMARK–3

a. Moderate B
b. Moderate Ecotoxicity
c. Moderate T (Group II or II* Human)
d. Moderate Flammability or Moderate Reactivity

Use but Still Opportunity for Improvement

GREENSCREEN BENCHMARK–2

a. Moderate P + Moderate B + Moderate T (Chronic Aquatic Toxicity or Group I or II* Human)
b. High P + Moderate T (Chronic Aquatic Toxicity or Group I or II* Human)
c. High B + Moderate T (Ecotoxicity or Group I, II, or II* Human)
d. Moderate T (Group I Human)
e. Very High T (Ecotoxicity or Group II Human) or High T (Group II* Human)
f. High Flammability or High Reactivity

Use but Search for Safer Substitutes

GREENSCREEN BENCHMARK–1

a. PBT = High P + High B + [very High T (Chronic Aquatic Toxicity) or High T (Group I or II* Human)]
b. vPT = very High P + [very High T (Chronic Aquatic Toxicity) or High T (Group I or II* Human)]
c. vBT = very High B + [very High T (Chronic Aquatic Toxicity) or High T (Group I or II* Human)]
d. High T (Group I Human)

Avoid—Chemical of High Concern

GREENSCREEN BENCHMARK–U
Unspecified Due to Insufficient Data

See Section 12.6 for instructions.

Group I Human includes Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive Toxicity, Developmental Toxicity (incl. Developmental Neurotoxicity), and Endocrine Activity. **Group II Human** includes Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects-Single Exposure, Neurotoxicity-Single Exposure, Eye Irritation and Skin Irritation. **Group II* Human** includes Systemic Toxicity/Organ Effects-Repeated Exposure, Neurotoxicity-Repeated Exposure, Respiratory Sensitization, and Skin Sensitization. Immune System Effects are included in Systemic Toxicity/Organ Effects. **Ecotoxicity** includes Acute Aquatic Toxicity and Chronic Aquatic Toxicity.

SECTION V — ANNEX 5

GreenScreen Benchmark Data Requirements

GreenScreen Benchmark Data Requirements

A5.1 **Benchmark-1:** Compare the hazard summary table for the chemical being assessed to the Benchmark-1 data requirements in Table A5.1 below.

TABLE A5.1: **Data Requirements for Benchmark-1**

Benchmark Score	Data Requirements and Permissible Data Gaps by Hazard Endpoint Category
Benchmark-1	A chemical may be assigned Benchmark-1 with data on as few as one endpoint. For example, if a chemical is definitively classified as a GHS Category 1 (High in GreenScreen) for the Group I endpoint Carcinogenicity, it would be assigned Benchmark-1 even if other endpoints had data gaps. If a chemical is not classified as Benchmark-1 based on hazard, then it must meet the data requirements for Benchmark-2.

A5.2 **Benchmark-2:** Compare the hazard summary table for the chemical being assessed to the Benchmark-2 data requirements in Table A5.2 below.

A5.2.1 If the chemical meets the data requirements for Benchmark-2 in addition to the Benchmark Criteria for Benchmark-2 (Annex 3 or 4), the chemical is assigned a final score of Benchmark-2.

A5.2.2 If the chemical does not meet the minimum data requirements for Benchmark-2, it is assigned a final score of Benchmark-U (Unspecified).

TABLE A5.2: **Data Requirements for Benchmark-2**

Benchmark Score	Data Requirements and Permissible Data Gaps by Hazard Endpoint Category			
Benchmark- 2	Group I Human	Group II and II* Human	Ecotoxicity& Fate	Physical Properties
	Data required for 3 out of 5 endpoints. Permissible data gaps include: 1. Endocrine Activity 2. Reproductive or Developmental Toxicity	Data required for 4 out of 7 endpoints. Permissible data gaps include: 1. Skin OR Respiratory Sensitization 2, Skin OR Eye Irritation 3. One other hazard endpoint	Data required for 3 out of 4 endpoints. Permissible data gaps include: 1. Acute OR Chronic Aquatic Toxicity	Data required for both endpoints.[1]

A5.3 **Benchmark-3:** Compare the hazard summary table for the chemical being assessed to the Benchmark-3 data requirements in Table A5.3 below.

A5.3.1 If the chemical meets the data requirements for Benchmark-3 in addition to the Benchmark Criteria for Benchmark-3 (Annex 3 or 4), the chemical is assigned a final score of Benchmark-3.

A5.3.2 If the chemical meets the Benchmark Criteria for Benchmark-3 but does not meet the minimum data requirements for Benchmark-3, the chemical is assigned the next lower Benchmark score for which the minimum data requirements are met with a subscript "DG".

A5.3.2.1 If the chemical meets the data requirements for Benchmark-2, the chemical is assigned a final score of Benchmark-2_{DG}.

1 i. It is sufficient to classify flammability based on data in as few as one relevant sub-category (e.g., flammable liquid); and

ii. It is sufficient to classify reactivity based on data in as few as one relevant sub-category (e.g., explosivity). If a chemical is not explosive, it meets the requirement for non-reactivity as long as there are no data stating otherwise.

A5.3.2.2 If the chemical does not meet the minimum data requirements for Benchmark-2, the chemical is assigned a final score of Benchmark-U (Unspecified).

TABLE A5.3: **Data Requirements for Benchmark-3**

Benchmark Score	Data Requirements and Permissible Data Gaps by Hazard Endpoint Category			
Benchmark-3	Group I Human	Group II and II* Human	Ecotoxicity & Fate	Physical Properties
	Data required for 4 out of 5 endpoints (max 1 data gap). Permissible data gap is: Endocrine Activity	Data required for 5 out of 7 endpoints (max 2 data gaps). Permissible data gaps include: 1. Skin OR Respiratory Sensitization 2. One other hazard endpoint	Data required for all 4 endpoints (max zero data gaps).	Data required for both endpoints (max zero data gaps).[2]

A5.4 **Benchmark-4:** Review the hazard summary table of the chemical being assessed and identify whether there are any data gaps. To achieve Benchmark-4, the chemical must have sufficient data to assess all eighteen hazard endpoints (no data gaps allowed).

A5.4.1 If the chemical meets the data requirements for Benchmark-4 in addition to the Benchmark Criteria for Benchmark-4 (Annex 3 or 4), the chemical is assigned a final score of Benchmark-4.

A5.4.1.1 Assessments based entirely on estimated values may not be sufficient to achieve Benchmark-4 based on expert judgment.

A5.4.2 If the chemical meets the Benchmark Criteria for Benchmark-4 but does not meet the minimum data requirements for Benchmark-4, the chemical is assigned the next lower Benchmark score for which the minimum data requirements are met with a subscript "DG".

A5.4.2.1 If the chemical meets the data requirements for Benchmark-3, the chemical is assigned a final score of Benchmark-3_{DG}.

A5.4.2.2 If the chemical meets the data requirements for Benchmark-2, the chemical is assigned a final score of Benchmark-2_{DG}.

A5.4.2.3 If the chemical does not meet the minimum data requirements for Benchmark-2, the chemical is assigned a final score of Benchmark-U (Unspecified).

(Footnotes)

2 i. It is sufficient to classify flammability based on data in as few as one relevant sub-category (e.g., flammable liquid);
ii. It is sufficient to classify reactivity based on data in as few as one relevant sub-category (e.g., explosivity). If a chemical is not explosive, it meets the requirement for non-reactivity as long as there are no data stating otherwise.

SECTION V — ANNEX 6

GreenScreen Benchmark Worksheet

GreenScreen Benchmark Criteria Worksheet

Compare the hazard summary table for the chemical being assessed with the appropriate Benchmark Criteria (Annex 3 or 4). Answer the following question regarding each criterion statement with a yes or no in the table below:

"Is the criterion statement true for the chemical being assessed?"

For example, if the chemical meets criterion "a" for Benchmark-1 (i.e., High P, and High B and High T (Group I Human)), put a "yes" in the box for 1a.

Fill in the first row completely before proceeding on to the next row. If you answer yes to any one or more criterion statements in a given row, you do not need to proceed to the next row.

Benchmark	a	b	c	d	e	f	g
1							
2							
3							
4							

SECTION V — ANNEX 7

GreenScreen Polymer Hazard Criteria

GreenScreen Polymer Hazard Criteria

TABLE A7.1: **GreenScreen Polymer Hazard Criteria**

		Hazard Levels[1]			
		Very High (vH)	High (H)	Moderate (M)	Low (L)
Group I Human Health Effects (Group I Human)	**Carcinogenicity (C)**		GHS Cat. 1A or 1B	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Mutagenicity & Genotoxicity (M)		GHS Cat. 1A or 1B	GHS Cat. 2	Adequate data available and negative studies for both chromosomal aberrations and gene mutations; and GHS not classified
	Reproductive Toxicity (R)		GHS Cat. 1A or 1B	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Developmental Toxicity (D)		GHS Cat. 1A or 1B	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Endocrine Activity (EA)		Evidence of endocrine activity and related human health effect.	Evidence of endocrine activity.	Adequate data available and negative studies
Group II and II* Human Health Effects (Group II and II* Human)	**Acute Mammalian Toxicity (AT)**	GHS Category 1 or 2 for any route of exposure	GHS Category 3 for any route of exposure	GHS Category 4 for any route of exposure	GHS Category 5; or Adequate data available and negative studies; and GHS not classified
	Systemic Toxicity & Organ Effects (ST-single)		GHS Cat. 1	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Systemic Toxicity & Organ Effects (ST-repeat)		GHS Cat. 1	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Neurotoxicity (N-single)		GHS Cat. 1	GHS Cat. 2	Adequate data and negative studies available
	Neurotoxicity (N-repeat)		GHS Cat. 1	GHS Cat. 2	Adequate data available and negative studies; and GHS not classified
	Skin Sensitization (SnS)		GHS Cat. 1A	GHS Cat. 1B	Adequate data available and negative studies; and GHS not classified
	Respiratory Sensitization (SnR)		GHS Cat. 1 or 1A	GHS Cat. 1B	Adequate data available and negative studies; and GHS not classified
	Skin Irritation (IrS)	GHS Cat. 1 (corrosive)	GHS Cat. 2	GHS Cat. 3	Adequate data available and negative studies; and GHS not classified
	Eye Irritation (IrE)	GHS Cat. 1	GHS Cat. 2A	GHS Cat. 2B	Adequate data available and negative studies; and GHS not classified
Ecotoxicity (Ecotox)	**Acute Aquatic Toxicity (AA)**	GHS Cat. 1	GHS Cat. 2	GHS Cat. 3	Adequate data available and negative studies; and GHS not classified
	Chronic Aquatic Toxicity (CA) (Chronic toxicity value (CTV))	≤ 0.1 mg/L	>0.1 to 1.0 mg/L	>1.0 to 10.0 mg/L or GHS Cat. 4	>10 mg/L

1 Cannot assign data gaps at this stage of assessment. Must assess all qualifying polymer constituents before a data gap can be assigned.

SECTION V — ANNEX 8

GreenScreen Qualifying Polymer Constituent/ Component Hazard Criteria

GreenScreen Qualifying Polymer Constituent/Component Hazard Criteria

GROUP I HUMAN HEALTH EFFECTS (GROUP I HUMAN)

TABLE A8.1: Carcinogenicity (C) — Non-Additive

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1A or 1B	GHS Cat. 2	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1A or 1B and present at >0.1%	GHS Cat. 2 and present at ≥ 1%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.2: Mutagenicity & Genotoxicity (M) — Non-Additive

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1A or 1B	GHS Cat. 2	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1A or 1B and present at >0.1%	GHS Cat. 2 and present at ≥ 1%	• Adequate data available and negative studies for both chromosomal aberrations and gene mutations; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.3: **Endocrine Activity (EA) — Non-Additive**

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	Evidence of endocrine activity and related human health effect.	Evidence of endocrine activity.	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	Evidence of endocrine activity and related human health effect and present at >0.1%	Evidence of endocrine activity and present at ≥ 1%	Adequate data available and negative studies	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.4: **Reproductive Toxicity (R) and Developmental (D) Toxicity — Non-Additive**

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1A or 1B	GHS Cat. 2	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1A or 1B and present at > 0.3%	GHS Cat. 2 and present at ≥ 3%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

SECTION V — ANNEX 8

GreenScreen Qualifying Polymer Constituent/Component Hazard Criteria

GROUP II AND II* HUMAN HEALTH EFFECTS (GROUP II AND II* HUMAN)

TABLE A8.5: **Acute Mammalian Toxicity (AT) — Additive**

		Hazard Levels				
		Very High (vH)	High (H)	Moderate (M)	Low (L)	Data Gap (DG)
Polymer Chain		GHS Category 1 or 2 for any route of exposure	GHS Category 3 for any route of exposure	GHS Category 4 for any route of exposure	• GHS Category 5; or • Adequate data available and negative studies; and • GHS not classified	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain. OR There is insufficient information to classify one or more qualifying constituent(s)/component(s).
GreenScreen Guidance Values for Calculated $ATE_{mixture}$	**Oral ATE (mg/kg)**	≤ 50	>50-300	> 300-2000	> 2000	N/A
	Dermal ATE (mg/kg)	≤ 200	>200-1000	> 1000-2000	> 2000	
	Inhalation-Gas or Vapor ATE (mg/L)	≤ 2	>2-10	> 10-20	> 20	
	Inhalation-Dust/Mist/Fumes ATE (mg/L)	≤ 0.5	>0.5-1.0	> 1-5	> 5	

The Acute Toxicity Estimate for the mixture ($ATE_{mixture}$) needs to be calculated and then compared against the GreenScreen Hazard Criteria to assign the corresponding hazard level as shown in Table A8.5.

The concentration limits in Table A8.5 are expressed as Acute Toxicity Estimate (ATE) values. The $ATE_{mixture}$ value represents the expected LD50/LC50 of the mixture and is calculated from the LD_{50}/LC_{50} values for all qualifying constituents according to the following formula for oral, dermal or inhalation toxicity.

$$\frac{100}{ATE_{mixture}} = \sum_{n} \frac{\%\ \text{ingredient is in formulation}}{LD_{50}\ \text{or}\ LC_{50}\ \text{for ingredient}}$$

Use the above equation if data are available for all ingredients in the mixture as per GHS Rev. 6 Section 3.1.3.6.1 (or equivalent section in future GHS versions). If data are not available for one or more ingredients in the mixture, follow the procedures in GHS Rev. 6 Section 3.1.3.6.2 (or equivalent section in future GHS versions).

TABLE A8.6: **Systemic Toxicity & Organ Effects (ST-single) and Neurotoxicity (N-single) — Non-Additive except for Cat.3**

	Hazard Levels				
	Very High (vH)	**High (H)**	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1	GHS Cat. 2	GHS Cat. 3	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1 and present at ≥ 10%	GHS Cat. 1 and present at ≥ 1% and < 10% Or GHS Cat. 2 and present at ≥10%	Sum of all GHS Cat. 3 qualifying constituents present at ≥ 1% is ≥ 20%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.7: **Systemic Toxicity & Organ Effects (ST-repeated) and Neurotoxicity (N-repeated) — Non-Additive**

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1	GHS Cat. 2	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1 and present at ≥ 10%	GHS Cat. 1 and present at ≥ 1% and < 10% Or GHS Cat. 2 and present at ≥10%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.8: **Skin Sensitization (SnS) — Non-Additive**

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1A	GHS Cat. 1B	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1A and present at >0.1%	GHS Cat. 1B and present at ≥ 1%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

TABLE A8.9: **Respiratory Sensitization (SnR) — Non-Additive**

	Hazard Levels			
	High (H)	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1 or 1A	GHS Cat. 1B	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/component(s) and there is insufficient information to classify polymer chain.
	OR	OR	AND	OR
Qualifying constituent(s)/component(s)	GHS Cat. 1 or 1A and present at >0.1%	GHS Cat. 1B and present at ≥ 1% (solid/liquid) or present at ≥ 0.2% (gas)	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/component(s).

SECTION V — ANNEX 8
GreenScreen Qualifying Polymer Constituent/Component Hazard Criteria

TABLE A8.10: **Skin Irritation (IrS) — Additive**

	Hazard Levels				
	Very High (vH)	**High (H)**	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1 (corrosive)	GHS Cat. 2	GHS Cat. 3	Expert judgment review (See Section 15.2.4 of guidance)	There are no qualifying constituent(s)/ component(s) and there is insufficient information to classify polymer chain.
	OR	OR	OR	AND	OR
Qualifying constituent(s)/ component(s)	Sum of all GHS Cat. 1 qualifying constituents present at ≥ 1% is ≥ 5%	Sum of all GHS Cat. 1 qualifying constituents present at ≥ 1% is <5% OR Sum of all GHS Cat. 2 qualifying constituents present at ≥ 1% is ≥ 10% OR [(10 X Sum of all GHS Cat. 1 qualifying constituents present at < 1%) + (Sum of all GHS Cat. 2 qualifying constituents present at ≥ 1%)] ≥ 10%	Sum of all GHS Cat. 2 qualifying constituents present at ≥ 1% is <10% OR Sum of all GHS Cat. 3 qualifying constituents present at ≥ 1% is ≥ 10% OR [(10 X Sum of all GHS Cat. 1 qualifying constituents present at < 1%) + (Sum of all GHS Cat. 2 qualifying constituents present at ≥ 1%)] < 10%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/ component(s).

TABLE A8.11: **Eye Irritation (IrE) — Additive**

	Hazard Levels				
	Very High (vH)	**High (H)**	**Moderate (M)**	**Low (L)**	**Data Gap (DG)**
Polymer Chain	GHS Cat. 1	GHS Cat. 2A	GHS Cat. 2B	Expert judgment review (see Section 15.2.4)	There are no qualifying constituent(s)/ component(s) and there is insufficient information to classify polymer chain.
	OR	OR	OR	AND	OR
Qualifying constituent(s)/ component(s)	Sum of all GHS Cat. 1 qualifying constituents present at ≥ 1% is ≥ 3%	Sum of all GHS Cat. 1 qualifying constituents present at ≥1% is <3% OR Sum of all GHS Cat. 2A qualifying constituents present at ≥ 1% is ≥ 10% OR [(10 X Sum of all GHS Cat. 1 qualifying constituents present at < 1%) + (Sum of all GHS Cat. 2A qualifying constituents present at ≥ 1%)] ≥ 10%	Sum of all GHS Cat. 2B qualifying constituents present at ≥ 1% is ≥ 10%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/ component(s).

ECOTOXICITY (ECOTOX)

Note: For Acute Aquatic Toxicity (Table A8.12) and Chronic Aquatic Toxicity (Table A8.13):

- Obtain Multiplying factors (M-factors) from GHS Rev. 7, Table 4.1.5 (https://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev07/English/ST_SG_AC10_30_Rev7e.pdf, accessed 1/8/18)
- CTV = Chronic Toxicity Value

TABLE A8.12: Acute Aquatic Toxicity (AA) — Additive

	Hazard Levels				
	Very High (vH)	High (H)	Moderate (M)	Low (L)	Data Gap (DG)
Polymer Chain	GHS Cat. 1	GHS Cat. 2	GHS Cat. 3	Expert judgment review (see Section 15.2.4)	There are no qualifying constituent(s)/ component(s) and there is insufficient information to classify polymer chain.
	OR	OR	OR	AND	OR
Qualifying constituent(s)/ component(s)	Sum of all GHS Cat. 1 qualifying constituents present at ≥ 0.1% multiplied by M-factor is ≥ 25%	[(10 X Sum of all GHS Cat. 1 qualifying constituents present at ≥ 0.1%) X M-factor) + (Sum of all GHS Cat. 2 qualifying constituents present at ≥ 1%)] ≥ 25%	[(100 x Sum of GHS Cat. 1 qualifying constituents present at ≥ 0.1% x M-factor) + (10 x Sum of GHS Cat. 2 qualifying constituents present at ≥ 1%) + (Sum of GHS Cat. 3 qualifying constituents present at ≥ 1%)] ≥ 25%	• Adequate data available and negative studies; and • GHS not classified	There is insufficient information to classify one or more qualifying constituent(s)/ component(s).

TABLE A8.13: Chronic Aquatic Toxicity (CA) — Additive

	Hazard Levels				
	Very High (vH)	High (H)	Moderate (M)	Low (L)	Data Gap (DG)
Polymer Chain	CTV ≤ 0.1 mg/L	CTV >0.1 to 1.0	CTV >1.0 to 10.0 or GHS Cat. 4	CTV > 10 mg/L	There are no qualifying constituent(s)/ component(s) and there is insufficient information to classify polymer chain.
	OR	OR	OR	AND	OR
Qualifying constituent(s)/ component(s)	Sum of all qualifying constituents with CTV ≤ 0.1 mg/L and present at ≥ 0.1% multiplied by M-factor is ≥ 25%	[(10 x Sum of all qualifying constituents with CTV ≤ 0.1 mg/L and present at ≥ 0.1% x M-factor) + [(sum of all qualifying constituents with 0.1 < CTV <1 mg/L and present at ≥ 1%)] ≥ 25%	[(100 x Sum of all qualifying constituents with CTV ≤ 0.1 mg/L and present at ≥ 0.1% x M-factor) + (10 x Sum of all qualifying constituents with 0.1< CTV < 1 mg/L and present at ≥ 1%) + (sum of all qualifying constituents with 1.0< CTV <10 mg/L and present at ≥ 1%)] ≥ 25%	Sufficient data available and does not meet criteria for vH, H or M	There is insufficient information to classify one or more qualifying constituent(s)/ component(s).

SECTION V — ANNEX 9

GreenScreen Transformation Product Worksheet & Resources

GreenScreen Transformation Product Worksheet & Resources

TABLE A9.1: **Worksheet for Identifying Feasible and Relevant Environmental Transformation Products**

The table below is provided as a worksheet that can be used to identify feasible and relevant environmental transformation products for each parent chemical. (Note: Not all identified transformation products may end up being feasible and relevant.)

Possible Transformation Pathways	**List chemical name and CAS# of Transformation Products based on pathways**	**Use-Phase analysis:** Describe how the chemical is typically used, released and/or managed at end of life. Describe the likely environmental transformation pathway *(e.g., the product is typically disposed of down the drain, aquatic biodegradation of the chemical is a feasible transformation pathway)*	**Identify potential hazards using GreenScreen hazard endpoints**
Hydrolysis			
Oxidation			
Reduction			
Substitution or elimination reactions			
Photochemical; photolysis			
Microbial biodegradation (aerobic)			
Microbial biodegradation (anaerobic)			
Other			

TABLE A9.2: **Common Sources Used for Identifying Environmental Transformation Products**

Resource	Description
Hazardous Substances Data Bank (HSDB)	An online toxicology data file on the National Library of Medicine's (NLM) Toxicology Data Network (TOXNET®). It focuses on the toxicology of potentially hazardous chemicals. It is enhanced with information on human exposure, industrial hygiene, emergency handling procedures, environmental fate, regulatory requirements, nanomaterials, and related areas. All data are referenced and derived from a core set of books, government documents, technical reports and selected primary journal literature. HSDB is peer-reviewed by the Scientific Review Panel (SRP), a committee of experts in the major subject areas within the data bank's scope. HSDB is organized into individual chemical records, and contains over 5000 such records. The records also include a section on 'Metabolism/Metabolites'. These sources often just recap what is in the scientific literature, but you can check them first before going on to look at the literature directly. (https://toxnet.nlm.nih.gov, accessed 12/22/17)
Perform a literature search using sources such as Web of Science to search peer-reviewed journals	Success with Web of Science typically depends on known occurrence and toxicity data (i.e. if it's known to be present in the environment or has established toxicity). Well-known journals with relevant information may include (but are not limited to): i. Environmental Science & Technology ii. Environmental Toxicology and Chemistry (ET&C) iii. Environment International iv. Chemosphere v. Science of the Total Environment vi. Environmental Pollution vii. Journal of Environmental Monitoring
Published Risk Assessments	Those conducted by regulatory bodies such as the European Union (EU), Canadian Environmental Protection Agency (CEPA), Japan's National Institute of Technology and Evaluation (NITE) and others often contain information on transformation products.
Human and Environmental Risk Assessment (HERA)	Chemical or functional class risk assessments on ingredients of household cleaning products. (http://www.heraproject.com, accessed 12/22/17)
European Chemical Agency (ECHA) — REACH	Registered chemicals listed under European Chemical Agency (ECHA) – REACH
Textbook resources	Chemical class specific information such as degradation products of surfactants; examples of textbook resources may include (but are not limited to): Swishers Handbook of Surfactant Biodegradation or S.S. Talmage, Environmental and Human Safety of Major Surfactants (1994)
The SRC FatePointer	(http://esc.syrres.com/fatepointer/search.asp, accessed 12/22/17)
University of Minnesota Pathway Biocatalysis Biodegradation Prediction Program	While the MN DB has about 1,300 chemicals in it and addresses microbial degradation, it is less comprehensive than a literature search. (http://eawag-bbd.ethz.ch, accessed 12/22/17)
The Organization for Economic Co-operation and Development (OECD) QSAR Tool box	Use of models for predicting chemical biodegradation/metabolism (http://www.oecd.org/env/ehs/risk-assessment/theoecdqsartoolbox.htm, accessed 12/22/17)

SECTION V — ANNEX 10

GreenScreen Information Sources

GreenScreen Information Sources

TABLE A10.1: **Information Sources**

Table A10.1 is intended to provide support for performing GreenScreen assessments. This Annex is NOT intended to serve as an exhaustive list of all information sources that should be used to perform a hazard assessment on a chemical.

ID	Abbreviation	Information Type	Information Source	URL and/or Reference	Date accessed
1	CHE	Database	Collaborative on Health and the Environment, Toxicant and Disease Database	http://www.healthandenvironment.org/tddb	12/22/17
2	GHS	Reference Criteria & Guidance	4th Revised Edition of the Globally Harmonized System of Classification and Labeling	[GHS Main] http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html (Note: GreenScreen v1.4 is currently harmonized with GHS Rev.7 (2017))	12/22/17
3	IRIS	Database	US Environmental Protection Agency (EPA), National Center for Environmental Assessment, Integrated Risk Information System (IRIS) Database, [List of substances]	http://cfpub.epa.gov/ncea/iris/index.cfm?fuseaction=iris.showSubstanceList	12/22/17
4	NIOSH/OSHA	Pocket Guide/ Database	NIOSH Pocket Guide	http://www.cdc.gov/niosh/npg/	12/22/17
5	TOXNET	Database Portal	The Toxicology Data Network	http://toxnet.nlm.nih.gov/index.html	12/22/17
6	eChemPortal	Database Portal	The Organisation for Economic Co-operation and Development eChemPortal	https://www.echemportal.org/echemportal/page.action?pageID=133	12/22/17
7	ACToR	Database Portal	Aggregated Computational Toxicology Resource	To link to ACToR main page, please use https://actor.epa.gov To link to a specific chemical by CASRN, use the URL: https://actor.epa.gov/actor/chemical.xhtml?casrn=CASRN For example: https://actor.epa.gov/actor/chemical.xhtml?casrn=80-05-7	12/22/17
8	ESIS	Database	The European Chemical Substances Information System (ESIS)	http://echa.europa.eu/en/information-on-chemicals	12/22/17
9	RTECS	Database	The Register of Toxic Effects of Chemical Substances (RTECS)—FEE BASED	http://ccinfoweb.ccohs.ca/rtecs/search.html	12/22/17
10	Ariel	Database	Ariel-WebInsight—FEE BASED; GHS classifications	http://3ecompany.com/products-services/decision-support-tools/ariel-webinsight/	12/22/17

TABLE A10.1: **Information Sources** CONTINUED

ID	Abbreviation	Information Type	Information Source	URL and/or Reference	Date accessed
11	LOLI	Database	LOLI (List of lists)—FEE BASED; GHS classifications	https://www.chemadvisor.com/products/loli-chemical-database	12/22/17
12	ECOTOX	Database	The ECOTOXicology Database	http://cfpub.epa.gov/ecotox/quick_query.htm	12/22/17
13	Scorecard	Database	Scorecard Chemical Profiles	http://scorecard.goodguide.com/chemical-profiles	12/22/17
14	PAN	Database	Pesticide Action Network Pesticide Database	http://www.pesticideinfo.org/Search_Chemicals.jsp	12/22/17
15	PubChem	Database	PubChem	http://pubchem.ncbi.nlm.nih.gov/	12/22/17
16	EXTOXNET	Database	Pesticide Information Profiles	http://extoxnet.orst.edu/ghindex.html	12/22/17
17	EPA RED	Database	U.S. EPA Reregistration Eligibility Decision Documents (Pesticides)	http://www.epa.gov/pesticides/reregistration/status_page_m.htm	12/22/17
18	CICA	Database	Concise International Chemical Assessment	http://www.who.int/ipcs/publications/cicad/en/index.html	12/22/17
19	ASTDR	Database	US Department of Health and Human Services, Agency for Toxic Substance & Disease Registry	http://www.atsdr.cdc.gov/az/a.html	12/22/17
20	ToxCast (formerly ToxRefDB)	Database	US EPA Toxicity ForeCaster (ToxCast™) Data	https://www.epa.gov/chemical-research/toxicity-forecaster-toxcasttm-data	12/22/17
21	EPI Suite	Model	US EPA EPI Suite™—Estimation Program Interface	http://www.epa.gov/tsca-screening-tools/epi-suitetm-estimation-program-interface	12/22/17
22	PBT Profiler	Model	US EPA PBT Profiler	http://www.pbtprofiler.net	12/22/17
23	ISSCAN	Model	Istituto Superiore di Sanita, "Chemical Carcinogens: Structures and Experimental Data"	http://www.epa.gov/ncct/dsstox/sdf_isscan_external.html	12/22/17
24	(Q)SAR	Model	Danish (Q)SAR Database	http://qsar.food.dtu.dk	12/22/17
25	REACH	Database	European Chemicals Agency (ECHA) Registered Substances Database	http://apps.echa.europa.eu/registered/registered-sub.aspx	12/22/17
26	FDA - ED	Database	US Food and Drug Administration (FDA) Endocrine Disruptor Knowledge Base (EDKB)	http://www.fda.gov/ScienceResearch/BioinformaticsTools/EndocrineDisruptorKnowledgebase/default.htm	12/22/17
27	CHIRP	Database	Japan National Institute of Technology and Evaluation (NITE) Chemical Risk Information Platform (CHRIP)	http://www.safe.nite.go.jp/english/db.html	12/22/17
28	UM-BBD	Database	University of Minnesota Biocatalysis/Biodegradation Database	https://www.ecfr.gov/cgi-bin/ECFR?page=browse	12/22/17
29	DOT	Hazard List	US Department of Transportation Hazardous Materials Regulation (Title 49 CFR parts 171-177	https://www.ecfr.gov/cgi-bin/ECFR?page=browse	1/8/18

SECTION V — ANNEX 10
Information Sources

TABLE A10.1: **Information Sources** CONTINUED

ID	Abbreviation	Information Type	Information Source	URL and/or Reference	Date accessed
30	EU-R-Phases	Hazard List	European Union List of Chemicals and their Harmonized (assigned) GHS Hazard Classifications - R-Phrases. Based on REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02006R1907-20171010&from=EN:	1/8/18
31	IPCC 3rd Assessment Report	Resource for GWP values	IPCC. (2001). Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Houghton, J.T., Ding, Y., Griggs, D.J., Noguer, M., van der Linden, P.J., Dai, X., Maskell, K., and Johnson, C.A. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 881 pp.	https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf TAR Climate Change 2001: The Scientific Basis — IPCC	8/5/25
32	IPCC 4th Assessment Report	Resource for GWP values	IPCC. (2007). Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K.B., Tignor, M., and Miller, H.L. (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.	https://www.ipcc.ch/site/assets/uploads/2018/05/ar4_wg1_full_report-1.pdf AR4 Climate Change 2007: The Physical Science Basis — IPCC	8/5/25
33	IPCC 5th Assessment Report	Resource for GWP values	IPCC. (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.	AR5 Synthesis Report: Climate Change 2014 — IPCC https://archive.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf	8/5/25
34	US CFR	Resource for GWP values	US – 40 C.F.R. Part. 98, Subpart. A. Table A-1 (2025)	https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-A#Table-A-1-to-Subpart-A-of-Part-98	1/3/26

SECTION V — ANNEX 11

GreenScreen Specified List™

SECTION V — ANNEX 11

GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Description**

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
AOEC–Asthmagens	Authoritative B	Association of Occupational and Environmental Clinics (AOEC)–Exposure Code List	Respiratory Sensitization	The main AOEC website is at the first link below. The current list of substances can be searched or listed from the webpage at the second link below. http://www.aoec.org/tools.htm http://www.aoecdata.org/ExpCodeLookup.aspx
Boyes–Neuro-toxicants	Screening B	Chemicals with Neurotoxicity-Based Occupational Exposure Standards (NIOSH/OSHA).	Developmental Toxicity including Developmental Neurotoxicity, Neurotoxicity	"Neurotoxicology and Behavior" chapter, William K. Boyes, Ph.D., et al.(eds.), in Patty's Industrial Hygiene and Toxicology, 2001 by John Wiley & Sons, Inc. Published Online: April 16, 2001. Chemicals listed in Table 25.1. (Updated 2012 version does not contain Table 25.1) http://onlinelibrary.wiley.com/doi/10.1002/0471435139.tox025/abstract
EC–CEPA Toxic Substances (Sched 1)	Screening B	Canadian Environmental Protection Act, 1999 (CEPA 1999): CEPA Toxic	PBT in "Multiple Endpoints"	A description of the CEPA Toxic Substances listing program appears at the first link. The current substance list is at the second link. http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=0DA2924D-1 http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=0DA2924D-1&wsdoc=4ABEFFC8-5BEC-B57A-F4BF-11069545E434
EC–CEPA DSL	Screening A and B	Canadian Categorization Decisions for Substances on the Domestic Substance List (DSL).	Persistence, Bioaccumulation and "Multiple Endpoints" for PBT and Human Health	Canadian Environmental Protection Act, 1999 (CEPA), September 2006. Description and specific lists by type (first link). The DSL categorization search engine is at the second link. Download the spreadsheet for "Categorization decisions for all DSL substances". Each column represents different endpoints: Column E - iT Human Column H - Persistence Column I - Bioaccumulation Column J - iT Environment http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=5F213FA8-1 http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=5F213FA8-1&wsdoc=D031CB30-B31B-D54C-0E46-37E32D526A1F
US EPA–EPCRA Extremely Hazardous Substances	Authoritative B	EPCRA Section 302 Extremely Hazardous Substances	Acute Mammalian Toxicity	Link leads to the USEPA Consolidated List of Lists, March 2015. GreenScreen utilizes only the EPCRA Section 302 Extremely Hazardous Substances. These are also listed in 40 CFR Part 355, Appendices A and B. http://www.epa.gov/epcra/epcracerclacaa-ss112r-consolidated-list-lists-march-2015-version

SECTION V — ANNEX 11
GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
US EPA–IRIS Carcinogens	Authoritative A and B	Integrated Risk Information System (IRIS) Database—Results from four separate cancer guideline regimes: 1986, 1996, 1999, and 2005.	Carcinogenicity	US EPA Integrated Risk Information System home page (first link). Advanced search by substance ID (second link). http://www.epa.gov/ncea/iris/search_human.htm https://www.epa.gov/iris
EU–REACH Annex XVII CMRs	Authoritative A	Annex XVII to REACH includes all restrictions adopted in the framework of REACH and the previous legislation, Directive 76/769/EEC.	Carcinogenicity, Mutagenicity/ Genotoxicity, Reproductive Toxicity, Developmental Toxicity	Access the full list of REACH Annex XVII chemicals using the first link below (Export search results function is at the bottom of the page). GreenScreen List Translator only includes C, M, and R substances from Entries 28, 29, and 30. The C, M, and R CASRN's referred to in Entries 28, 29 and 30 are listed in Appendices 1-6 of REACH Regulation EC (No) 1907/2006, which is updated semi-regularly through amendments (Second link below). https://echa.europa.eu/substances-restricted-under-reach https://echa.europa.eu/regulations/reach/legislation
EU–Annex VI CMRs	Authoritative A	Annex VI to CLP Regulation (EC) No 1272/2008 includes a list of chemicals and the harmonised GHS Hazard Classifications.	Carcinogenicity, Mutagenicity/ Genotoxicity, eproductive Toxicity, Developmental Toxicity	ECHA provides an updated excel list of all harmonized classifications. Access the full list of CASRNs with associated harmonized GHS classifications using the first link below (Export search results function is at the bottom of the page). The second link is the source EU regulation for general reference: Table 3 of Annex VI to the CLP Regulation (EC) No 1272/2008. https://echa.europa.eu/information-on-chemicals/annex-vi-to-clp https://echa.europa.eu/regulations/clp/legislation
EU–Priority Endocrine Disrupters	Screening A and B	European Union Priority List of suspected endocrine disruptors.	Endocrine Activity	List developed from four EU studies published between 1999 and 2007. Categorization results contained in 1) reports and 2) a consolidated Microsoft Access database at the link below. http://ec.europa.eu/environment/chemicals/endocrine/strategy/substances_en.htm#priority_list
EU–GHS (H-Statements)[5]	Authoritative A and B	The EU country specific list is displayed separately as "EU–GHS (H-Statements)".	All endpoints, both individual and "Multiple Endpoints"	ECHA provides an updated excel list of all harmonized classifications. Access the full list of CASRNs with associated harmonized GHS classifications using the first link below (Export search results function is at the bottom of the page). https://echa.europa.eu/information-on-chemicals/cl-inventory-database https://echa.europa.eu/information-on-chemicals/annex-vi-to-clp

SECTION V — ANNEX 11
GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
EU–ESIS PBT	Screening A	European Chemical Substances Information System (ESIS) PBT list	PBT and combinations in "Multiple Endpoints"	Chemicals that fulfill PBT and/or vPvB criteria and those that are Deferred are included in GreenScreen and provided at the following link. Do not include the chemicals which are labeled as "Not Fulfilling" the criteria and those "under evaluation". https://echa.europa.eu/information-on-chemicals/pbt-vpvb-assessments-under-the-previous-eu-chemicals-legislation
EU–SVHC Candidate List	Authoritative A and B	European Union Substances of Very High Concern Candidate List	Carcinogenicity, Mutagenicity/ Genotoxicity, Endocrine Activity, Reproductive and/or Developmental Toxicity, and PBT or vPvB in "Multiple Endpoints", and Equivalent Concern	https://echa.europa.eu/candidate-list-table
EU–SVHC Prioritisation List	Authoritative A and B	European Union Substances of Very High Concern Prioritisation List	Carcinogenicity, Mutagenicity/ Genotoxicity, Endocrine Activity, Reproductive and/or Developmental Toxicity, and PBT or vPvB in "Multiple Endpoints", and Equivalent Concern	Prioritisation list entries are chemicals from the EU—SVHC Candidate List that are prioritized for listing on the EU—Authorisation List. Export the spreadsheet using the following link and sort by "Recommended for inclusion in Annex XIV." https://echa.europa.eu/previous-recommendations
EU–SVHC Authorisation List	Authoritative A and B	European Union Substances of Very High Concern Subject to Authorization.	Carcinogenicity, Mutagenicity/ Genotoxicity, Endocrine Activity, Reproductive and/or Developmental Toxicity, PBT or vPvB in "Multiple Endpoints", and Equivalent Concern	The List of Substances Subject to Authorisation (Annex XIV of the REACH Regulation) is found at the first link. Additional information on authorisation can be found at the second link. http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/authorisation-list http://echa.europa.eu/regulations/reach/authorisation
G&L–Neurotoxic Chemicals	Screening B	Grandjean & Landrigan, List of 201 Chemicals Known to be Neurotoxic in Humans.	Neurotoxicity and Developmental Toxicity (includes Developmental Neurotoxicity)	Grandjean, P & PJ Landrigan, "Developmental neurotoxicity of industrial chemicals," Lancet, v368: 2167-2178, 2006 (first link). Grandjean, P & PJ Landrigan, "Neurobehavioural effects of developmental toxicity," The Lancet Neurology, V13: 330–38, published 2014 (second link). http://www.ncbi.nlm.nih.gov/pubmed/17174709_ http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4418502/
IARC	Authoritative A and B	International Agency for Research on Cancer (IARC), Substances Reviewed in IARC Monographs and Supplements.	Carcinogenicity	Lists provided at the link below reference the relevant IARC monograph volume or supplement. Substances may be listed by CAS number, name |or collectively as a substance group. http://monographs.iarc.fr/ENG/Classification/index.php

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GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
MAK	Authoritative A and B	MAK Commission of Germany; Occupational Toxicants and MAK Values: Annual Thresholds and Classifications for the Workplace	Carcinogenicity, Reproductive and Developmental Toxicity (including Developmental Neurotoxicity), Skin and Respiratory Sensitization	The German Research Foundation's (DFG) Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area ("MAK Commission") is at the first link. MAK Commission classification categories are available via PDFs at Wiley (second link, updated annually): http://www.dfg.de/en/dfg_profile/statutory_bodies/senate/health_hazards/index.html http://onlinelibrary.wiley.com/book/10.1002/3527600418/homepage/access_to_the_list_of_mak_and_bat_values.htm
US CDC–Occupational Carcinogens	Authoritative A	National Institute of Occupational Safety and Health Carcinogen List	Carcinogenicity	NIOSH's carcinogen policy is described at the first link below. The current occupational carcinogen list is at the second link http://www.cdc.gov/niosh/topics/cancer/policy.html http://www.cdc.gov/niosh/topics/cancer/npotoca.html
US NIH–Reproductive & Developmental Monographs	Authoritative A and B	US National Institutes of Health, National Institute of Environmental Health Sciences, National Toxicology Program (NTP) Studies on Reproductive and Developmental Toxicity	Reproductive and Developmental Toxicity	The NIEHS Office of Health Assessment and Translation (OHAT) can be found at the first link. Reports and monographs from NTP studies (ongoing and completed) can be found at the second link. http://www.niehs.nih.gov/research/atniehs/dntp/assoc/ohat/index.cfm http://ntp.niehs.nih.gov/pubhealth/hat/noms/index.html
US NIH–Report on Carcinogens	Authoritative A	US National Institutes of Health, National Institute of Environmental Health Sciences, National Toxicology Program (NTP), Report on Carcinogens (RoC)	Carcinogenicity	The Report on Carcinogens (RoC) is prepared by the National Toxicology Program (NTP) on behalf of the Secretary, Health and Human Services (description at the first link). The latest RoC edition is available at the second link. http://ntp.niehs.nih.gov/pubhealth/roc/index.html http://ntp.niehs.nih.gov/pubhealth/roc/roc12/index.html
US EPA– Priority PBTs (NWMP)	Authoritative A	US Environmental Protection Agency (EPA), National Waste Minimization Program, Priority Chemicals	PBT in "Multiple Endpoints"	The National Waste Minimization Program Priority Chemicals List can be found at the link below. Additional descriptive information is included in list footnotes. https://www.dtsc.ca.gov/SCP/upload/1-L-US-EPA_NWM.pdf
OR DEQ–Priority Persistent Pollutants	Screening A	Oregon Department of Environmental Quality (DEQ) Priority Persistent Pollutant (P3) List, required in Oregon Senate Bill 737	PBT in "Multiple Endpoints"	The main website describing the list and process are at the first link. The second link contains a PDF list of P3 substances including technical listing criteria. http://www.deq.state.or.us/wq/SB737 http://www.deq.state.or.us/wq/SB737/docs/LegRpAtt20100601.pdf

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GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
OSPAR	Authoritative B and Screening B	OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic, List of Chemicals for Priority Action and List of Substances of Possible Concern	PBT in "Multiple Endpoints;" Endocrine Disruption	The first link contains an overview of the OSPAR hazardous substances program. The List of Chemicals for Priority Action (as a Microsoft Word document) appears at the second link. A List of Substances of Possible Concern (as a webpage) appears at the third link. http://www.ospar.org/work-areas/hasec/chemicals/overview http://www.ospar.org/work-areas/hasec/chemicals/priority-action http://www.ospar.org/work-areas/hasec/chemicals/possible-concern/list
CA EPA–Prop 65	Authoritative A	State of California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act Of 1986) Chemicals Known to the State to Cause Cancer or Reproductive Toxicity	Carcinogenicity, Reproductive and Developmental Toxicity (including Developmental Neurotoxicity)	Prop 65 descriptive information is at the first link below. The second link provides the current list of substances. http://oehha.ca.gov/proposition-65/about-proposition-65 http://oehha.ca.gov/proposition-65/proposition-65-list
CA EPA–Prop 65 (with qualifications)[3]	Authoritative B	State of California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA) California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act Of 1986) Chemicals Known to the State to Cause Cancer or Reproductive Toxicity	Carcinogenicity, Reproductive and Developmental Toxicity (including Developmental Neurotoxicity)	Prop 65 descriptive information is at the first link below. The second link provides the current list of substances. http://oehha.ca.gov/proposition-65/about-proposition-65 http://oehha.ca.gov/proposition-65/proposition-65-list
ChemSec–SIN List	Screening A and B	International Chemical Secretariat (ChemSec) Substitute it Now (SIN) List	Endocrine Activity and "Multiple Endpoints" for CMR (Carcinogenicity, Mutagenicity/Genotoxicity; Reproductive and Developmental Toxicity), PBT and vPvB	A description of ChemSec is available at the first link below. The current SIN List can be searched or listed in full at the website at the second link below. http://chemsec.org/about-us http://sinlist.chemsec.org/
UNEP Stockholm Conv–Persistent Organic Pollutants	Authoritative A	United Nations Environment Programme (UNEP), Stockholm Convention Secretariat Stockholm Convention on Persistent Organic Pollutants (POPs)	POP in PBT "Multiple Endpoints"	The main Stockholm Convention website is at the first link below. The current POP chemicals are listed on the webpage at the second link below. http://chm.pops.int/ http://chm.pops.int/TheConvention/ThePOPs/ListingofPOPs/tabid/2509/Default.aspx

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
TEDX–Potential Endocrine Disruptor	Screening B	The Endocrine Disruptor Exchange (TEDX) List of Potential Endocrine Disruptors	Endocrine Activity	The main TEDX website is at the first link below. The current list of potential endocrine disruptors can be searched or listed from the webpage at the second link below. http://endocrinedisruption.org/ http://endocrinedisruption.org/endocrine-disruption/tedx-list-of-potential-endocrine-disruptors/chemicalsearch
US EPA–Toxics Release Inventory PBTs	Authoritative A	US Environmental Protection Agency (EPA), Toxics Release Inventory (TRI) Program, "TRI PBT Chemical List"	PBT in "Multiple Endpoints"	The main EPA TRI website is at the first link below. The current TRI-PBTs are listed on the webpage at the second link. http://www2.epa.gov/toxics-release-inventory-tri-program http://www2.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri
German FEA–Substances Hazardous to Waters	Screening B	German Federal Environment Agency, Administrative Regulation on the Classification of Substances hazardous to waters into Water Hazard Classes (Verwaltungsvorschrift wassergefahrdende Stoffe - VwVwS)	PBT in "Multiple Endpoints"	Information on the listing process and governing regulation is found at the first link below. A database of chemicals and classifications (Rigoletto) is at the second link. http://www.umweltbundesamt.de/en/topics/chemicals/substances-hazardous-to-waters http://webrigoletto.uba.de/rigoletto/public/searchRequest.do?event=request
WA DoE–PBT	Screening A	State of Washington, Department of Ecology, Chapter 173-333 WAC Persistent Bioaccumulative Toxins	PBT in "Multiple Endpoints"	The WA Department of Ecology PBT program website is at the first link below. The current PBTs are listed on the webpage at the second link. http://www.ecy.wa.gov/programs/hwtr/RTT/pbt/index.html http://www.ecy.wa.gov/programs/hwtr/RTT/pbt/list.html
Québec CSST–WHMIS 1988	Authoritative B and Screening A and B	Workplace Hazardous Materials Information System: Controlled Product as defined in Part IV of the Controlled Product Regulations (Canada)	Acute Mammalian Toxicity, Reactivity, Flammability and "Multiple Endpoints"	Description of the WHMIS is available at the first link below. The Quebec CSST site (second link) contains a list of controlled products, also available by CAS number and as a txt or PDF file. http://www.hc-sc.gc.ca/ewh-semt/occup-travail/whmis-simdut/index-eng.php http://www.csst.qc.ca/en/prevention/reptox/Pages/list-whmis-1988-cas-50-84.aspx

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GreenScreen List Translator™ Map

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
GHS–Country][4]	Screening A and B	Includes all publically accessible lists of chemicals classified using the Globally Harmonized System of Classification and Labeling and published by an authoritative governmental organization of a country. The countries with published lists include Australia, Indonesia, Japan, Korea, Malaysia, Taiwan, and Thailand. The EU country-specific list is covered under the Authoritative A Specified List titled "EU H-Statements."	All endpoints including human health, ecotoxicity, fate and physical hazard endpoints.	See Country-specific lists below for information on how to access each country's list of chemicals and classifications.
GHS–Australia	Screening A	The chemicals on this list include those listed by the EU, in addition to those classified by the Australian National Industrial Chemical Notification and Assessment Scheme and those assessed under the Australian Agricultural and Veterinary Chemicals Code Act 1994.	All human health, ecotoxicity, and physical hazard endpoints.	The Hazardous Chemical Information System (HCIS) is a database that allows you to find information on chemicals that have been classified in accordance with the GHS. Download the list using the link below. http://hsis.safeworkaustralia.gov.au/GHSInformation/GHS_Hazardous_Chemical_Information_List
GHS–Japan	Screening A	Japanese List of Chemicals and their assigned GHS Classification.	All human health, ecotoxicity, fate and physical hazard endpoints.	The NITE Chemical Risk Information Platform (NITE-CHRIP) database can be used to search for GHS Classifications for chemicals individually. To retrieve a full list of CASRNs, "check all the boxes" in the "GHS Classification Results by the Japanese Government" section, which is a subsection under "Chemical Hazard and Risk Information". http://www.nite.go.jp/en/chem/chrip/chrip_search/srhInput
GHS–Korea	Screening A	Korea List of Chemicals and their assigned GHS Classification.	All human health, ecotoxicity, and physical hazard endpoints.	The Korean National Chemicals Information System (NCiS) can be used to search for GHS Classifications for chemicals. GreenScreen List Translator only includes chemicals in 5 broad search categories: Phase-in substances subject to registration, Toxic Substances, Restricted Substances, Prohibited Substances, and Substances requiring preparation for accidents. Search each category, as a chemical may be on one list and not another. http://ncis.nier.go.kr/en/main.do
GHS–Malaysia	Screening A	Malaysia List of Chemicals and their assigned GHS Classification.	All human health, ecotoxicity, and physical hazard endpoints.	The Chemical Search database provided by the Malaysia Department of Environmental Safety and Health (DOSH) can be used to search for GHS Classifications for individual chemicals only. http://cims.dosh.gov.my/

TABLE A11.1: **GreenScreen Specified Lists and Descriptions** CONTINUED

Abbreviation	CPA List Type[1]	List Name	Associated GreenScreen Hazard Endpoints	URL and/or Reference[2]
GHS–New Zealand	Screening A	New Zealand List of Chemicals and their assigned GHS Classification.	All human health, ecotoxicity, and physical hazard endpoints.	The Chemical Classification and Information Database (CCID) provided by the New Zealand Hazardous Substances and New Organisms (HSNO) can be used to search for hazards of individual chemicals (first link). New Zealand uses their own classification terminology which need to be converted to GHS classification categories to be used in the List Translator. A document describing the translation from HSNO to GHS classification is available at the second link.
				http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx
				http://www.epa.govt.nz/Publications/hsnogen-ghs-nz-hazard.pdf
Montreal Protocol	Authoritative A	Montreal Protocol Substances that Deplete the Ozone Layer	Ozone Depletion Potential	UNEP. (2020). Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer: Tenth Edition. United Nations Environment Programme (UNEP), Ozone Secretariat, Nairobi, Kenya, 672 pp.
				https://ozone.unep.org/sites/default/files/Handbooks/MP-Handbook-2020-English.pdf
EU–EC No 1005/2009	Authoritative A	REGULATION (EC) No 1005/2009— substances that deplete the ozone layer	Ozone Depletion Potential	European Union. (2009). Regulation (EC) No 1005/2009 of the European Parliament and of the Council of 16 September 2009 on substances that deplete the ozone layer. Official Journal of the European Union, L 286, 1–30.
				https://eur-lex.europa.eu/eli/reg/2009/1005/oj/eng

1 See Table A11.2 for List Definitions.

2 Reference URL links provided here are external links managed by other organizations and are dynamic in nature. CPA will make every effort to keep the links up to date.

3 Hazards may be form-specific or based on limited exposure pathways. Listing of a chemical should always be supported by data from literature.

4 GreenScreen List Translator uses the GHS Categories (e.g., Carcinogen Category 1A) to derive scores for GHS-[COUNTRY] lists. Lists available in each country will contain either the GHS Categories and/or GHS H-statements for chemicals. The latest revision of GHS can be used to determine equivalencies between GHS Categories and H-Statements (https://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html. The exception is the GHS—[NEW ZELAND] list, where their classification codes must be converted to GHS categories manually. In addition, Due to problems with translation and access, the lists for Indonesia, Taiwan and Thailand are not required in GreenScreen List Translator Version 1.4 and have not been included in automated tools at this time. These lists will be included as they become available.

5 R-Phrases are no longer required in GreenScreen List Translator. When conducting a manual GreenScreen List Translator assessment, use Table 1.1 CLP Regulation (EC) No 1272/2008 for translating any R-Phrases into H-statements first, if needed (Access the full English (EN) at http://echa.europa.eu/regulations/clp/legislation).

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GreenScreen List Translator™ Map

TABLE A11.2: **Specific List Definitio**

List Type		Definition	Can you modify results?	Level of Confidence
Authoritative Lists		Authoritative lists are generated by recognized experts, often as part of a government regulatory process to identify chemicals and known associated hazards. These lists are considered to be of high reliability and should only be changed when new data or special circumstances clearly indicate that a new level-of-concern is warranted. Intervention of a Licensed Profiler or CPA's Toxicologist would be required to validate such a change.		
	Authoritative A	This category in the list translates directly to one of the following: 1) a single hazard classification for a single GreenScreen hazard endpoint, or 2) a single Benchmark.	No	High
	Authoritative B	Categories that meet one or more of the following: 1) This category in the list incorporates a single GreenScreen hazard endpoint and does not translate directly to a single hazard classification or Benchmark; AND/OR 2) This category in the list refers to more than one GreenScreen hazard endpoint; AND/OR 3) This category in the list specifies that the hazard is associated with a specific form of the substance or a specific exposure route.	Yes	Low
Screening Lists		Screening Lists result in a classification with a lower level of confidence because at least one of the following is true of the list. It was: a. developed using a less comprehensive review, b. compiled by an organization that is not considered to be authoritative, c. developed using predominantly or exclusively estimated data, or d. developed to identify chemicals for further review and/or testing.		
	Screening A	This category in the list translates directly to one of the following: 1) a single hazard classification for a single GreenScreen hazard endpoint, or 2) a single Benchmark.	Yes	Low
	Screening B	Categories that meet one or more of the following: 1) This category in the list incorporates a single GreenScreen hazard endpoint and does not translate directly to a single hazard classification or Benchmark; AND/OR 2) This category in the list refers to more than one GreenScreen hazard endpoint; AND/OR 3) This category in the list specifies that the hazard is associated with a specific form of the substance or a specific exposure route.	Yes	Low

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GreenScreen List Translator™ Map

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
1	AOEC – Asthmagens	Asthmagen (G) – generally accepted	Respiratory Sensitization	Authoritative	B	H, M, or L	UNK	UNK
2	AOEC – Asthmagens	Asthmagen (Rr) – irritant–induced	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK
3	AOEC – Asthmagens	Asthmagen (Rr & Rs) – irritant–induced & sensitizer–induced	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK
4	AOEC – Asthmagens	Asthmagen (Rs) – sensitizer–induced	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK
5	Boyes – Neurotoxicants	Developmental Neurotoxicity	Developmental Toxicity	Screening	B	H, M, or L	UNK	UNK
6	Boyes – Neurotoxicants	Neurotoxic	Neurotoxicity – Either Exposure[4]	Screening	B	vH, H, M, or L	UNK	UNK
7	CA EPA – Prop 65	Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
8	CA EPA – Prop 65	Developmental toxicity	Developmental Toxicity	Authoritative	A	H	H	1
9	CA EPA – Prop 65	Reproductive toxicity – Female	Reproductive Toxicity	Authoritative	A	H	H	1
10	CA EPA – Prop 65	Reproductive toxicity – Male	Reproductive Toxicity	Authoritative	A	H	H	1
11	CA EPA – Prop 65 (with qualifications)	Carcinogen – specific to chemical form or exposure route	Carcinogenicity	Authoritative	B	H or M	H or M	P1
12	CA EPA – Prop 65 (with qualifications)	Developmental toxicity	Developmental Toxicity	Authoritative	B	H or M	H or M	P1
13	CA EPA – Prop 65 (with qualifications)	Reproductive toxicity – Female	Reproductive Toxicity	Authoritative	B	H or M	H or M	P1
14	CA EPA – Prop 65 (with qualifications)	Reproductive toxicity – Male	Reproductive Toxicity	Authoritative	B	H or M	H or M	P1
15	ChemSec – SIN List	Endocrine Disruption	Endocrine Activity	Screening	B	H or M	H or M	P1
16	EC – CEPA DSL	Bioaccumulative	Bioaccumulation	Screening	A	vH	vH	UNK
17	EC – CEPA DSL	Persistent	Persistence	Screening	B	vH or H	vH or H	UNK
18	EU – Annex VI CMRs	Carcinogen Category 1A – Known human Carcinogen based on human evidence	Carcinogenicity	Authoritative	A	H	H	1
19	EU – Annex VI CMRs	Carcinogen Category 1B – Presumed Carcinogen based on animal evidence	Carcinogenicity	Authoritative	A	H	H	1
20	EU – Annex VI CMRs	Carcinogen Category 2 – Suspected human Carcinogen	Carcinogenicity	Authoritative	A	M	M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
21	EU – Annex VI CMRs	Mutagen – Category 1A	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
22	EU – Annex VI CMRs	Mutagen – Category 1B	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
23	EU – Annex VI CMRs	Mutagen – Category 2	Mutagenicity/ Genotoxicity	Authoritative	A	M	M	UNK
24	EU – GHS (H-Statements)	H300 – Fatal if swallowed	Acute Mammalian Toxicity	Authoritative	A	vH	vH	UNK
25	EU – GHS (H-Statements)	H301 – Toxic if swallowed	Acute Mammalian Toxicity	Authoritative	A	H	H	UNK
26	EU – GHS (H-Statements)	H302 – Harmful if swallowed	Acute Mammalian Toxicity	Authoritative	A	M	M	UNK
27	EU – GHS (H-Statements)	H304 – May be fatal if swallowed and enters airways	Systemic Toxicity/ Organ Effects (Single Exposure–Aspiration Hazard)	Authoritative	A	H	H	UNK
28	EU – GHS (H-Statements)	H304 – May be fatal if swallowed and enters airways	Systemic Toxicity/ Organ Effects (Single Exposure–Aspiration Hazard)	Authoritative	A	H	H	UNK
29	EU – GHS (H-Statements)	H310 – Fatal in contact with skin	Acute Mammalian Toxicity	Authoritative	A	vH	vH	UNK
30	EU – GHS (H-Statements)	H311 – Toxic in contact with skin	Acute Mammalian Toxicity	Authoritative	A	H	H	UNK
31	EU – GHS (H-Statements)	H312 – Harmful in contact with skin	Acute Mammalian Toxicity	Authoritative	A	M	M	UNK
32	EU – GHS (H-Statements)	H314 – Causes severe skin burns and eye damage	Skin Irritation/ Corrosivity	Authoritative	A	vH	vH	UNK
33	EU – GHS (H-Statements)	H315 – Causes skin irritation	Skin Irritation/ Corrosivity	Authoritative	A	H	H	UNK
34	EU – GHS (H-Statements)	H317 – May cause an allergic skin reaction	Skin Sensitization	Authoritative	B	H or M	H or M	UNK
35	EU – GHS (H-Statements)	H318 – Causes serious eye damage	Eye Irritation/ Corrosivity	Authoritative	A	vH	vH	UNK
36	EU – GHS (H-Statements)	H319 – Causes serious eye irritation	Eye Irritation/ Corrosivity	Authoritative	A	H	H	UNK
37	EU – GHS (H-Statements)	H320 – Causes eye irritation	Eye Irritation/ Corrosivity	Authoritative	A	M	M	UNK
38	EU – GHS (H-Statements)	H330 – Fatal if inhaled	Acute Mammalian Toxicity	Authoritative	A	vH	vH	UNK
39	EU – GHS (H-Statements)	H331 – Toxic if inhaled	Acute Mammalian Toxicity	Authoritative	A	H	H	UNK
40	EU – GHS (H-Statements)	H332 – Harmful if inhaled	Acute Mammalian Toxicity	Authoritative	A	M	M	UNK
41	EU – GHS (H-Statements)	H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
42	EU – GHS (H-Statements)	H335 – May cause respiratory irritation	Systemic Toxicity/ Organ Effects (Single Exposure)	Authoritative	A	M	M	UNK
43	EU – GHS (H-Statements)	H336 – May cause drowsiness or dizziness	Neurotoxicity–Single Exposure	Authoritative	B	M or L	M or L	UNK
44	EU – GHS (H-Statements)	H340 – May cause genetic defects	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
45	EU – GHS (H-Statements)	H341 – Suspected of causing genetic defects	Mutagenicity/ Genotoxicity	Authoritative	A	M	M	UNK
46	EU – GHS (H-Statements)	H350 – May cause cancer	Carcinogenicity	Authoritative	A	H	H	1
47	EU – GHS (H-Statements)	H350i – May cause cancer by inhalation	Carcinogenicity	Authoritative	A	H	H	1
48	EU – GHS (H-Statements)	H351 – Suspected of causing cancer	Carcinogenicity	Authoritative	A	M	M	UNK
49	EU – GHS (H-Statements)	H360D – May damage the unborn child	Developmental Toxicity	Authoritative	A	H	H	1
50	EU – GHS (H-Statements)	H360Df – May damage the unborn child. Suspected of damaging fertility	Developmental Toxicity	Authoritative	A	H	H	1
51	EU – GHS (H-Statements)	H360Df – May damage the unborn child. Suspected of damaging fertility	Reproductive Toxicity	Authoritative	A	M	M	UNK
52	EU – GHS (H-Statements)	H360F – May damage fertility	Reproductive Toxicity	Authoritative	A	H	H	1
53	EU – GHS (H-Statements)	H360Fd – May damage fertility. Suspected of damaging the unborn child	Developmental Toxicity	Authoritative	A	M	M	UNK
54	EU – GHS (H-Statements)	H360Fd – May damage fertility. Suspected of damaging the unborn child	Reproductive Toxicity	Authoritative	A	H	H	1
55	EU – GHS (H-Statements)	H360FD – May damage fertility. May damage the unborn child	Developmental Toxicity	Authoritative	A	H	H	1
56	EU – GHS (H-Statements)	H360FD – May damage fertility. May damage the unborn child	Reproductive Toxicity	Authoritative	A	H	H	1
57	EU – GHS (H-Statements)	H361d – Suspected of damaging the unborn child	Developmental Toxicity	Authoritative	A	M	M	UNK
58	EU – GHS (H-Statements)	H361f – Suspected of damaging fertility	Reproductive Toxicity	Authoritative	A	M	M	UNK
59	EU – GHS (H-Statements)	H361fd – Suspected ofdamaging fertility. Suspected of damaging the unborn child	Developmental Toxicity	Authoritative	A	M	M	UNK
60	EU – GHS (H-Statements)	H361fd – Suspected of damaging fertility. Suspected of damaging the unborn child	Reproductive Toxicity	Authoritative	A	M	M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
61	EU – GHS (H-Statements)	H362 – May cause harm to breast–fed children	Developmental Toxicity	Authoritative	A	H	H	1
62	EU – GHS (H-Statements)	H370 – Causes damage to organs	Systemic Toxicity/ Organ Effects (Single Exposure)	Authoritative	A	vH	vH	UNK
63	EU – GHS (H-Statements)	H400 – Very toxic to aquatic life	Acute Aquatic Toxicity	Authoritative	A	vH	vH	UNK
64	EU – Priority Endocrine Disrupters	Category 1 – In vivo evidence of Endocrine Disruption Activity	Endocrine Activity	Screening	B	H or M	H or M	P1
65	EU – Priority Endocrine Disrupters	Category 2 – In vitro evidence of biological activity related to Endocrine Disruption	Endocrine Activity	Screening	B	H or M	H or M	P1
66	EU – Priority Endocrine Disrupters	Category 3a (ED Studies available but no indication of ED effects)	Endocrine Activity	Screening	A	L	L	UNK
67	EU – Priority Endocrine Disrupters	Category 3b (Substances with no or insufficient data gathered)	Endocrine Activity	Screening	B	H, M, or L	UNK	UNK
68	EU – REACH Annex XVII CMRs	Carcinogen Category 1 – Substances known to be Carcinogenic to man	Carcinogenicity	Authoritative	A	H	H	1
69	EU – REACH Annex XVII CMRs	Carcinogen Category 2 – Substances which should be regarded as if they are Carcinogenic to man	Carcinogenicity	Authoritative	A	H	H	1
70	EU – REACH Annex XVII CMRs	Carcinogen Category 3 – Possibly Carcinogenic to humans (listed as Carc. Cat. 3)	Carcinogenicity	Authoritative	A	M	M	UNK
71	EU – REACH Annex XVII CMRs	Mutagen Category 1 – Substances known to be Mutagenic to man	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
72	EU – REACH Annex XVII CMRs	Mutagen Category 2 – Substances which should be regarded as if they are Mutagenic to man	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
73	EU – REACH Annex XVII CMRs	Mutagen Category 3 – Possible	Mutagenicity/ Genotoxicity	Authoritative	A	M	M	UNK
74	EU – SVHC Authorisation List	Carcinogenic – Banned unless Authorised	Carcinogenicity	Authoritative	A	H	H	1
75	EU – SVHC Authorisation List	Equivalent Concern – Banned Unless Authorized	Systemic Toxicity/ Organ Effects (Repeated Exposure)	Authoritative	A	H	H	UNK

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
76	EU – SVHC Authorisation List	Equivalent Concern – Banned Unless Authorized: endocrine disrupting properties cause probable serious effects to the environment or human health	Endocrine Activity	Authoritative	A	H	H	1
77	EU – SVHC Authorisation List	Equivalent Concern – Banned Unless Authorized: Respiratory sensitizing	Respiratory Sensitization	Authoritative	A	H	H	UNK
78	EU – SVHC Authorisation List	Mutagenic – Banned unless Authorised	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
79	EU – SVHC Candidate List	Carcinogenic – Candidate List	Carcinogenicity	Authoritative	A	H	H	1
80	EU – SVHC Candidate List	Equivalent Concern – Candidate List: endocrine disrupting properties cause probable serious effects to the environment or human health	Endocrine Activity	Authoritative	A	H	H	1
81	EU – SVHC Candidate List	Equivalent Concern – Candidate List	Systemic Toxicity/ Organ Effects (Repeated Exposure)	Authoritative	A	H	H	UNK
82	EU – SVHC Candidate List	Equivalent Concern – Candidate List: Respiratory sensitizing	Respiratory Sensitization	Authoritative	A	H	H	UNK
83	EU – SVHC Candidate List	Mutagenic – Candidate List	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
84	EU – SVHC Prioritisation List	Mutagenic – Prioritized for listing	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
85	EU – SVHC Prioritisation List	Carcinogenic – Prioritized for listing	Carcinogenicity	Authoritative	A	H	H	1
86	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing	Systemic Toxicity/ Organ Effects (Repeated Exposure)	Authoritative	A	H	H	UNK
87	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing: endocrine disrupting properties cause probable serious effects to the environment or human health	Endocrine Activity	Authoritative	A	H	H	1
88	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing: Respiratory sensitizing	Respiratory Sensitization	Authoritative	A	H	H	UNK
78	EU – SVHC Authorisation List	Mutagenic – Banned unless Authorised	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
79	EU – SVHC Candidate List	Carcinogenic – Candidate List	Carcinogenicity	Authoritative	A	H	H	1

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
80	EU – SVHC Candidate List	Equivalent Concern – Candidate List: endocrine disrupting properties cause probable serious effects to the environment or human health	Endocrine Activity	Authoritative	A	H	H	1
81	EU – SVHC Candidate List	Equivalent Concern – Candidate List	Systemic Toxicity/ Organ Effects (Repeated Exposure)	Authoritative	A	H	H	UNK
82	EU – SVHC Candidate List	Equivalent Concern – Candidate List: Respiratory sensitizing	Respiratory Sensitization	Authoritative	A	H	H	UNK
83	EU – SVHC Candidate List	Mutagenic – Candidate List	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
84	EU – SVHC Prioritisation List	Mutagenic – Prioritized for listing	Mutagenicity/ Genotoxicity	Authoritative	A	H	H	1
85	EU – SVHC Prioritisation List	Carcinogenic – Prioritized for listing	Carcinogenicity	Authoritative	A	H	H	1
86	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing	Systemic Toxicity/ Organ Effects (Repeated Exposure)	Authoritative	A	H	H	UNK
87	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing: endocrine disrupting properties cause probable serious effects to the environment or human health	Endocrine Activity	Authoritative	A		H	1
88	EU – SVHC Prioritisation List	Equivalent Concern – Prioritized for Listing: Respiratory sensitizing	Respiratory Sensitization	Authoritative	A	H	H	UNK
89	G&L – Neurotoxic Chemicals	Developmental Neurotoxicant	Developmental Toxicity	Screening	B	H or M	H or M	P1
90	G&L – Neurotoxic Chemicals	Neurotoxic	Neurotoxicity – Either Exposure[4]	Screening	B	vH, H, or M	UNK	UNK
91	GHS – [COUNTRY]	Category 1	Acute Aquatic Toxicity	Screening	A	vH	vH	UNK
92	GHS – [COUNTRY]	Category 1	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
93	GHS – [COUNTRY]	Category 1	Systemic Toxicity/ Organ Effects (Single Exposure – Aspiration Hazard)	Screening	A	H	H	UNK
94	GHS – [COUNTRY]	Category 1 (Corrosive)	Skin Irritation/ Corrosivity	Screening	A	vH	vH	UNK
95	GHS – [COUNTRY]	Category 1 (Irreversible)	Eye Irritation/ Corrosivity	Screening	A	vH	vH	UNK
96	GHS – [COUNTRY]	Category 1A (High Frequency of Occurrence)	Respiratory Sensitization	Screening	A	H	H	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
97	GHS – [COUNTRY]	Category 1A (High Frequency of Occurrence)	Skin Sensitization	Screening	A	H	H	UNK
98	GHS – [COUNTRY]	Category 1A (Known)	Carcinogenicity	Screening	A	H	H	P1
99	GHS – [COUNTRY]	Category 1A (Known)	Developmental Toxicity	Screening	A	H	H	P1
100	GHS – [COUNTRY]	Category 1A (Known)	Mutagenicity/ Genotoxicity	Screening	A	H	H	P1
101	GHS – [COUNTRY]	Category 1A (Known)	Reproductive Toxicity	Screening	A	H	H	P1
102	GHS – [COUNTRY]	Category 1B (Low to Moderate Frequency of Occurrence)	Respiratory Sensitization	Screening	A	M	M	UNK
103	GHS – [COUNTRY]	Category 1B (Low to Moderate Frequency of Occurrence)	Skin Sensitization	Screening	A	M	M	UNK
104	GHS – [COUNTRY]	Category 1B (Presumed)	Carcinogenicity	Screening	A	H	H	P1
105	GHS – [COUNTRY]	Category 1B (Presumed)	Developmental Toxicity	Screening	A	H	H	P1
106	GHS – [COUNTRY]	Category 1B (Presumed)	Mutagenicity/ Genotoxicity	Screening	A	H	H	P1
107	GHS – [COUNTRY]	Category 1B (Presumed)	Reproductive Toxicity	Screening	A	H	H	P1
108	GHS – [COUNTRY]	Category 2	Acute Aquatic Toxicity	Screening	A	H	H	UNK
109	GHS – [COUNTRY]	Category 2	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
110	GHS – [COUNTRY]	Category 2	Systemic Toxicity/ Organ Effects (Single Exposure – Aspiration Hazard)	Screening	A	M	M	UNK
111	GHS – [COUNTRY]	Category 2 (Irritant)	Skin Irritation/ Corrosivity	Screening	A	H	H	UNK
112	GHS – [COUNTRY]	Category 2 (Suspected)	Carcinogenicity	Screening	A	M	M	UNK
113	GHS – [COUNTRY]	Category 2 (Suspected)	Developmental Toxicity	Screening	A	M	M	UNK
114	GHS – [COUNTRY]	Category 2 (Suspected)	Mutagenicity/ Genotoxicity	Screening	A	M	M	UNK
115	GHS – [COUNTRY]	Category 2 (Suspected)	Reproductive Toxicity	Screening	A	M	M	UNK
116	GHS – [COUNTRY]	Category 2A (Irritating)	Eye Irritation/ Corrosivity	Screening	A	H	H	UNK
117	GHS – [COUNTRY]	Category 2B (Mildly irritating)	Eye Irritation/ Corrosivity	Screening	A	M	M	UNK
118	GHS – [COUNTRY]	Category 3	Acute Aquatic Toxicity	Screening	A	M	M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
119	GHS – [COUNTRY]	Category 3	Acute Mammalian Toxicity	Screening	A	H	H	UNK
120	GHS – [COUNTRY]	Category 3 (Mild irritant)	Skin Irritation/ Corrosivity	Screening	A	M	M	UNK
121	GHS – [COUNTRY]	Category 4	Acute Mammalian Toxicity	Screening	A	M	M	UNK
122	GHS – [COUNTRY]	Category 5	Acute Mammalian Toxicity	Screening	A	L	L	UNK
123	GHS – [COUNTRY]	Effects on or via lactation	Developmental Toxicity	Screening	A	H	H	P1
124	GHS – [COUNTRY]	H300 – Fatal if swallowed	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
125	GHS – [COUNTRY]	H301 – Toxic if swallowed	Acute Mammalian Toxicity	Screening	A	H	H	UNK
126	GHS – [COUNTRY]	H302 – Harmful if swallowed	Acute Mammalian Toxicity	Screening	A	M	M	UNK
127	GHS – [COUNTRY]	H303 – May be harmful if swallowed	Acute Mammalian Toxicity	Screening	A	L	L	UNK
128	GHS – [COUNTRY]	H304 – May be fatal if swallowed and enters airways	Systemic Toxicity/ Organ Effects (Single Exposure – Aspiration Hazard)	Screening	A	H	H	UNK
129	GHS – [COUNTRY]	H305 – May be harmful if swallowed and enters airways	Systemic Toxicity/ Organ Effects (Single Exposure – Aspiration Hazard)	Screening	A	M	M	UNK
130	GHS – [COUNTRY]	H310 – Fatal in contact with skin	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
131	GHS – [COUNTRY]	H311 – Toxic in contact with skin	Acute Mammalian Toxicity	Screening	A	H	H	UNK
132	GHS – [COUNTRY]	H312 – Harmful in contact with skin	Acute Mammalian Toxicity	Screening	A	M	M	UNK
133	GHS – [COUNTRY]	H313 – May be harmful in contact with skin	Acute Mammalian Toxicity	Screening	A	L	L	UNK
134	GHS – [COUNTRY]	H314 – Causes severe skin burns and eye damage	Skin Irritation/ Corrosivity	Screening	A	vH	vH	UNK
135	GHS – [COUNTRY]	H315 – Causes skin irritation	Skin Irritation/ Corrosivity	Screening	A	H	H	UNK
136	GHS – [COUNTRY]	H316 – Causes mild skin irritation	Skin Irritation/ Corrosivity	Screening	A	M	M	UNK
137	GHS – [COUNTRY]	H317 – May cause an allergic skin reaction	Skin Sensitization	Screening	B	H or M	H or M	UNK
138	GHS – [COUNTRY]	H330 – Fatal if inhaled	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
139	GHS – [COUNTRY]	H331 – Toxic if inhaled	Acute Mammalian Toxicity	Screening	A	H	H	UNK
140	GHS – [COUNTRY]	H332 – Harmful if inhaled	Acute Mammalian Toxicity	Screening	A	M	M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
141	GHS – [COUNTRY]	H333 – May be harmful if inhaled	Acute Mammalian Toxicity	Screening	A	L	L	UNK
142	GHS – [COUNTRY]	H334 – May cause allergy or asthma symptoms or breathing difficulties if inhaled	Respiratory Sensitization	Screening	B	H or M	H or M	UNK
143	GHS – [COUNTRY]	H335 – May cause respiratory irritation	Systemic Toxicity/ Organ Effects (Single Exposure)	Screening	A	M	M	UNK
144	GHS – [COUNTRY]	H336 – May cause drowsiness or dizziness	Neurotoxicity–Single Exposure	Screening	B	M or L	M or L	UNK
145	GHS – [COUNTRY]	H340 – May cause genetic defects	Mutagenicity/ Genotoxicity	Screening	A	H	H	P1
146	GHS – [COUNTRY]	H341 – Suspected of causing genetic defects	Mutagenicity/ Genotoxicity	Screening	A	M	M	UNK
147	GHS – [COUNTRY]	H350 – May cause cancer	Carcinogenicity	Screening	A	H	H	P1
148	GHS – [COUNTRY]	H350i – May cause cancer by inhalation	Carcinogenicity	Screening	A	H	H	P1
149	GHS – [COUNTRY]	H351 – Suspected of causing cancer	Carcinogenicity	Screening	A	M	M	UNK
150	GHS – [COUNTRY]	H360D – May damage the unborn child	Developmental Toxicity	Screening	A	H	H	P1
151	GHS – [COUNTRY]	H360Df – May damage the unborn child. Suspected of damaging fertility	Developmental Toxicity	Screening	A	H	H	P1
152	GHS – [COUNTRY]	H360Df – May damage the unborn child. Suspected of damaging fertility	Reproductive Toxicity	Screening	A	M	M	UNK
153	GHS – [COUNTRY]	H360F – May damage fertility	Reproductive Toxicity	Screening	A	H	H	P1
154	GHS – [COUNTRY]	H360FD – May damage fertility. May damage the unborn child	Developmental Toxicity	Screening	A	H	H	P1
155	GHS – [COUNTRY]	H360FD – May damage fertility. May damage the unborn child	Reproductive Toxicity	Screening	A	H	H	P1
156	GHS – [COUNTRY]	H360Fd May damage fertility. May damage the unborn child	Developmental Toxicity	Screening	A	M	M	UNK
157	GHS – [COUNTRY]	H360Fd– May damage fertility. May damage the unborn child	Reproductive Toxicity	Screening	A	H	H	P1
158	GHS – [COUNTRY]	H361d – Suspected of damaging the unborn child	Developmental Toxicity	Screening	A	M	M	UNK
159	GHS – [COUNTRY]	H361f – Suspected of damaging fertility	Reproductive Toxicity	Screening	A	M	M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

ID	GreenScreen Supporting List Information		GreenScreen List Translator					
	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
160	GHS – [COUNTRY]	H361fd – Suspected of damaging fertility. Suspected of damaging the unborn child	Developmental Toxicity	Screening	A	M	M	UNK
161	GHS – [COUNTRY]	H361fd – Suspected of damaging fertility. Suspected of damaging the unborn child	Reproductive Toxicity	Screening	A	M	M	UNK
162	GHS – [COUNTRY]	H362 – May cause harm to breast–fed children	Developmental Toxicity	Screening	A	H	H	P1
163	GHS – [COUNTRY]	H400 – Very toxic to aquatic life	Acute Aquatic Toxicity	Screening	A	vH	vH	UNK
164	GHS – [COUNTRY]	H401 – Toxic to aquatic life	Acute Aquatic Toxicity	Screening	A	H	H	UNK
165	GHS – [COUNTRY]	H402 – Harmful to aquatic life	Acute Aquatic Toxicity	Screening	A	M	M	UNK
166	GHS – [COUNTRY]	Not Classified	Acute Aquatic Toxicity	Screening	A	L	L	UNK
167	GHS – [COUNTRY]	Not Classified	Acute Mammalian Toxicity	Screening	A	L	L	UNK
168	GHS – [COUNTRY]	Not Classified	Eye Irritation/ Corrosivity	Screening	A	L	L	UNK
169	GHS – [COUNTRY]	Not Classified	Respiratory Sensitization	Screening	A	L	L	UNK
170	GHS – [COUNTRY]	Not Classified	Skin Irritation/ Corrosivity	Screening	A	L	L	UNK
171	GHS – [COUNTRY]	Not Classified	Skin Sensitization	Screening	A	L	L	UNK
172	GHS – [COUNTRY]	Not Classified	Systemic Toxicity/ Organ Effects (Single Exposure – Aspiration Hazard)	Screening	A	L	L	UNK
173	GHS – [COUNTRY]	Not Classified (i.e. positively determined to be negative)	Carcinogenicity	Screening	A	L	L	UNK
174	GHS – [COUNTRY]	Not Classified (i.e. positively determined to be negative)	Mutagenicity/ Genotoxicity	Screening	A	L	L	UNK
175	GHS – [COUNTRY]	Not Classified for developmental effects	Developmental Toxicity	Screening	A	L	L	UNK
176	GHS – [COUNTRY]	Not Classified for reproductive effects	Reproductive Toxicity	Screening	A	L	L	UNK
177	GHS – [NEW ZEALAND]	6.1A	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
178	GHS – [NEW ZEALAND]	6.1B	Acute Mammalian Toxicity	Screening	A	vH	vH	UNK
179	GHS – [NEW ZEALAND]	6.1C	Acute Mammalian Toxicity	Screening	A	H	H	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
180	GHS – [NEW ZEALAND]	6.1D	Acute Mammalian Toxicity	Screening	A	M	M	UNK
181	GHS – [NEW ZEALAND]	6.1E	Acute Mammalian Toxicity	Screening	A	L	L	UNK
182	GHS – [NEW ZEALAND]	6.1E	Systemic Toxicity/ Organ Effects (Single Exposure–Aspiration Hazard)	Screening	B	H or M	H or M	UNK
183	GHS – [NEW ZEALAND]	6.3A	Skin Irritation/ Corrosivity	Screening	A	H	H	UNK
184	GHS – [NEW ZEALAND]	6.3B	Skin Irritation/ Corrosivity	Screening	A	M	M	UNK
185	GHS – [NEW ZEALAND]	6.4A	Eye Irritation/ Corrosivity	Screening	B	H or M	H or M	UNK
186	GHS – [NEW ZEALAND]	6.5A	Respiratory Sensitization	Screening	B	H or M	H or M	UNK
187	GHS – [NEW ZEALAND]	6.5B	Skin Sensitization	Screening	B	H or M	H or M	UNK
188	GHS – [NEW ZEALAND]	6.6A	Mutagenicity/ Genotoxicity	Screening	A	H	H	P1
189	GHS – [NEW ZEALAND]	6.6B	Mutagenicity/ Genotoxicity	Screening	A	M	M	UNK
190	GHS – [NEW ZEALAND]	6.7A	Carcinogenicity	Screening	A	H	H	P1
191	GHS – [NEW ZEALAND]	6.7B	Carcinogenicity	Screening	A	M	M	UNK
192	GHS – [NEW ZEALAND]	6.8A	Developmental Toxicity	Screening	A	H	H	P1
193	GHS – [NEW ZEALAND]	6.8A	Reproductive Toxicity	Screening	A	H	H	P1
194	GHS – [NEW ZEALAND]	6.8B	Developmental Toxicity	Screening	A	M	M	UNK
195	GHS – [NEW ZEALAND]	6.8B	Reproductive Toxicity	Screening	A	M	M	UNK
196	GHS – [NEW ZEALAND]	6.8C	Developmental Toxicity	Screening	A	H	H	P1
197	GHS – [NEW ZEALAND]	8.2A	Skin Irritation/ Corrosivity	Screening	A	vH	vH	UNK
198	GHS – [NEW ZEALAND]	8.2B	Skin Irritation/ Corrosivity	Screening	A	vH	vH	UNK
199	GHS – [NEW ZEALAND]	8.2C	Skin Irritation/ Corrosivity	Screening	A	vH	vH	UNK
200	GHS – [NEW ZEALAND]	8.3A	Eye Irritation/ Corrosivity	Screening	A	vH	vH	UNK
201	GHS – [NEW ZEALAND]	9.1A	Acute Aquatic Toxicity	Screening	A	vH	vH	UNK
202	GHS – [NEW ZEALAND]	9.1D	Acute Aquatic Toxicity	Screening	B	H or M	H or M	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
203	GHS – [NEW ZEALAND]	Not Classified	Acute Aquatic Toxicity	Screening	A	L	L	UNK
204	GHS – [NEW ZEALAND]	Not Classified	Acute Mammalian Toxicity	Screening	A	L	L	UNK
205	GHS – [NEW ZEALAND]	Not Classified	Carcinogenicity	Screening	A	L	L	UNK
206	GHS – [NEW ZEALAND]	Not Classified	Eye Irritation/ Corrosivity	Screening	A	L	L	UNK
207	GHS – [NEW ZEALAND]	Not Classified	Mutagenicity/ Genotoxicity	Screening	A	L	L	UNK
208	GHS – [NEW ZEALAND]	Not Classified	Skin Irritation/ Corrosivity	Screening	A	L	L	UNK
209	GHS – [NEW ZEALAND]	Not Classified for developmental effects	Developmental Toxicity	Screening	A	L	L	UNK
210	GHS – [NEW ZEALAND]	Not Classified for reproductive effects	Reproductive Toxicity	Screening	A	L	L	UNK
211	IARC	Group 1 – Agent is Carcinogenic to humans	Carcinogenicity	Authoritative	A	H	H	1
212	IARC	Group 2a – Agent is probably Carcinogenic to humans	Carcinogenicity	Authoritative	A	H	H	1
213	IARC	Group 2b – Possibly carcinogenic to humans	Carcinogenicity	Authoritative	A	M	M	UNK
214	IARC	Group 3 – Agent is not classifiable as to its carcinogenicity to humans	Carcinogenicity	Authoritative	B	H, M, or L	UNK	UNK
215	IARC	Group 4 – Agent is probably not carcinogenic to humans	Carcinogenicity	Authoritative	A	L	L	UNK
216	MAK	Carcinogen Group 1 – Substances that cause cancer in man	Carcinogenicity	Authoritative	A	H	H	1
217	MAK	Carcinogen Group 2 – Considered to be carcinogenic for man	Carcinogenicity	Authoritative	A	H	H	1
218	MAK	Carcinogen Group 3A (or 3B) – Evidence of carcinogenic effects but not sufficient to establish MAK/BAT value (classify)	Carcinogenicity	Authoritative	A	M	M	UNK
219	MAK	Carcinogen Group 4 – Non–genotoxic carcinogen with low risk under MAK/BAT levels	Carcinogenicity	Authoritative	A	M	M	UNK
220	MAK	Carcinogen Group 5 – Genotoxic carcinogen with very slight risk under MAK/BAT levels	Carcinogenicity	Authoritative	A	M	M	UNK
221	MAK	Germ Cell Mutagen 1	Mutagenicity/ Genotoxicity	Authoritative	B	H or M	H or M	P1

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
222	MAK	Germ Cell Mutagen 2	Mutagenicity/ Genotoxicity	Authoritative	B	H or M	H or M	P1
223	MAK	Germ Cell Mutagen 3a	Mutagenicity/ Genotoxicity	Authoritative	B	H or M	H or M	P1
224	MAK	Germ Cell Mutagen 3b	Mutagenicity/ Genotoxicity	Authoritative	B	H, M, or L	UNK	UNK
225	MAK	Germ Cell Mutagen 5	Mutagenicity/ Genotoxicity	Authoritative	B	H, M, or L	UNK	UNK
226	MAK	Pregnancy Risk Group A	Developmental Toxicity	Authoritative	B	H or M	H or M	P1
227	MAK	Pregnancy Risk Group B	Developmental Toxicity	Authoritative	B	H or M	H or M	P1
228	MAK	Pregnancy Risk Group C	Developmental Toxicity	Authoritative	B	M or L	M or L	UNK
229	MAK	Pregnancy Risk Group D	Developmental Toxicity	Authoritative	B	H, M, or L	UNK	UNK
230	MAK	Sensitizing Substance Sah – Danger of airway sensitization	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK
231a	MAK	Sensitizing Substance Sah – Danger of airway & skin sensitization	Respiratory Sensitization	Authoritative	B	H or M	H or M	UNK
231b	MAK	Sensitizing Substance Sah – Danger of airway & skin sensitization	Skin Sensitization	Authoritative	B	H or M	H or M	UNK
232	MAK	Sensitizing Substance Sh – Danger of skin sensitization	Skin Sensitization	Authoritative	B	H or M	H or M	UNK
233	OSPAR	Endocrine Disruptor – chemical for priority action	Endocrine Activity	Authoritative	B	H or M	H or M	P1
234	OSPAR	Endocrine Disruptor – substance of possible concern	Endocrine Activity	Screening	B	H or M	H or M	P1
235	Québec CSST – WHMIS 1988	Class D1A – Very toxic material causing immediate and serious toxic effects	Acute Mammalian Toxicity	Screening	B	vH or H	vH or H	UNK
236	Québec CSST – WHMIS 1988	Class D1B – Toxic material causing immediate and serious toxic effects	Acute Mammalian Toxicity	Screening	B	vH, H, or M	UNK	UNK
237	TEDX – Potential Endocrine Disruptors	Potential Endocrine Disruptor	Endocrine Activity	Screening	B	H or M	H or M	P1
238	US CDC – Occupational Carcinogens	Occupational Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
239	US EPA – EPCRA Extremely Hazardous Substances	Extremely Hazardous Substances	Acute Mammalian Toxicity	Authoritative	B	vH or H	vH or H	UNK

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GreenScreen List Translator™ Map

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
240	US EPA – IRIS Carcinogens	(1986) Group A – Human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
241	US EPA – IRIS Carcinogens	(1986) Group B1 – Probable human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
242	US EPA – IRIS Carcinogens	(1986) Group B2 – Probable human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
243	US EPA – IRIS Carcinogens	(1986) Group C – Possible human Carcinogen	Carcinogenicity	Authoritative	A	M	M	UNK
244	US EPA – IRIS Carcinogens	(1986) Group D – Not classifiable as to human Carcinogenicity	Carcinogenicity	Authoritative	B	H, M, or L	UNK	UNK
245	US EPA – IRIS Carcinogens	(1986) Group E – Evidence of non–carcinogenicity for humans	Carcinogenicity	Authoritative	A	L	L	UNK
246	US EPA – IRIS Carcinogens	(1996) Known/likely human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
247	US EPA – IRIS Carcinogens	(1999, 2005) Carcinogenic to humans	Carcinogenicity	Authoritative	A	H	H	1
248	US EPA – IRIS Carcinogens	(1999, 2005) Likely to be Carcinogenic to humans	Carcinogenicity	Authoritative	A	H	H	1
249	US EPA – IRIS Carcinogens	(1999, 2005) Not likely to be Carcinogenic to humans	Carcinogenicity	Authoritative	A	L	L	UNK
250	US EPA – IRIS Carcinogens	(1999) Suggestive evidence of Carcinogenicity	Carcinogenicity	Authoritative	B	H, M, or L	UNK	UNK
251	US EPA – IRIS Carcinogens	(2005) Suggestive evidence of Carcinogenic potential	Carcinogenicity	Authoritative	B	H, M, or L	UNK	UNK
252	US NIH – Report on Carcinogens	Known to be a human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
253	US NIH – Report on Carcinogens	Reasonably Anticipated to be Human Carcinogen	Carcinogenicity	Authoritative	A	H	H	1
254	US NIH – Reproductive & Developmental Monographs	Clear Evidence of Adverse Effects – Developmental Toxicity	Developmental Toxicity	Authoritative	A	H	H	1
255	US NIH – Reproductive & Developmental Monographs	Clear Evidence of Adverse Effects – Reproductive Toxicity	Reproductive Toxicity	Authoritative	A	H	H	1
256	US NIH – Reproductive & Developmental Monographs	Clear Evidence of no Adverse Effects – Developmental Toxicity	Developmental Toxicity	Authoritative	A	L	L	UNK
257	US NIH – Reproductive & Developmental Monographs	Clear Evidence of no Adverse Effects – Reproductive Toxicity	Reproductive Toxicity	Authoritative	A	L	L	UNK

TABLE A12.1: **Human Health and Ecotox Lists (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
258	US NIH – Reproductive & Developmental Monographs	Insufficient Evidence for a Conclusion – Developmental Toxicity	Developmental Toxicity	Authoritative	B	H, M, or L	UNK	UNK
259	US NIH – Reproductive & Developmental Monographs	Insufficient Evidence for a Conclusion – Reproductive Toxicity	Reproductive Toxicity	Authoritative	B	H, M, or L	UNK	UNK
260	US NIH – Reproductive & Developmental Monographs	Limited Evidence of Adverse Effects– Developmental Toxicity	Developmental Toxicity	Authoritative	B	H or M	H or M	P1
261	US NIH – Reproductive & Developmental Monographs	Limited Evidence of Adverse Effects–Reproductive Toxicity	Reproductive Toxicity	Authoritative	B	H or M	H or M	P1
262	US NIH – Reproductive & Developmental Monographs	Limited Evidence of no Adverse Effects – Developmental Toxicity	Developmental Toxicity	Authoritative	B	M or L	M or L	UNK
263	US NIH – Reproductive & Developmental Monographs	Limited Evidence of no Adverse Effects – Reproductive Toxicity	Reproductive Toxicity	Authoritative	B	M or L	M or L	UNK
264	US NIH – Reproductive & Developmental Monographs	Some Evidence of Adverse Effects – Developmental Toxicity	Developmental Toxicity	Authoritative	B	H or M	H or M	P1
265	US NIH – Reproductive & Developmental Monographs	Some Evidence of Adverse Effects – Reproductive Toxicity	Reproductive Toxicity	Authoritative	B	H or M	H or M	P1
266	US NIH – Reproductive & Developmental Monographs	Some Evidence of no Adverse Effects – Developmental Toxicity	Developmental Toxicity	Authoritative	B	M or L	M or L	UNK
267	US NIH – Reproductive & Developmental Monographs	Some Evidence of no Adverse Effects – Reproductive Toxicity	Reproductive Toxicity	Authoritative	B	M or L	M or L	UNK

SECTION V — ANNEX 12
GreenScreen List Translator™ Map

TABLE A12.2: **Multiple Hazard Endpoints**

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
268	ChemSec– SIN List	CMR–Carcinogen, Mutagen &/or Reproductive Toxicant	One or more of the following: Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity.	Screening	A	U	Mult	P1
269	ChemSec– SIN List	PBT	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1
270	ChemSec– SIN List	vPvB	Persistence and Bioaccumulation	Screening	A	U	Mult	P1
271	EC– CEPA DSL	Inherently Toxic to Humans (iT human)	One or more of the following Human Health Effects: Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive Toxicity, Developmental Toxicity, Acute Mammalian Toxicity, System Toxicity/Organ Effects.	Screening	B	U	Mult	UNK
272	EC–CEPA DSL	Inherently Toxic to the Environment (iT environment)	Acute aquatic toxicity or Chronic aquatic toxicity	Screening	B	U	Mult	UNK
273	EC–CEPA DSL	Persistent, Bioaccumulative and inherently Toxic (PBiTE) to the Environment (based on aquatic organisms)	PBT [Persistence, Bioaccumulation, and Acute Aquatic Toxicity or Chronic Aquatic Toxicity	Screening	A	U	Mult	P1
274	EC–CEPA DSL	Persistent, Bioaccumulative and inherently Toxic (PBiTH) to humans	PBT [Persistence, Bioaccumulation and Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1
275	EC–CEPA Toxic Substances (Sched 1)	CEPA Toxic	One or more of the following: Human Health Effects, Ecotoxicity, and/or Fate endpoints.	Screening	B	U	Mult	UNK
276	EU–Annex VI CMRs	Reproductive Toxicity–Category 1A	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
277	EU–Annex VI CMRs	Reproductive Toxicity–Category 1B	Reproductive and/or Developmental Toxicity	Authoritative	B	H (Rand/or D)	Mult	1
278	EU–Annex VI CMRs	Reproductive Toxicity–Category 2	Reproductive and/or Developmental Toxicity	Authoritative	B	M (R and/or D)	Mult	UNK

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
279	EU–ESIS PBT	PBT	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1
280	EU–ESIS PBT	POP (Persistent Organic Pollutant)	Persistent Organic Pollutant [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1
281	EU–ESIS PBT	vPvB	vPvB [Persistence, Bioaccumulation]	Screening	A	U	Mult	P1
282	EU–GHS (H-Statements)	H360 (with no letters)–May damage fertility or the unborn child <state specific effect if known > <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
283	EU–HS (H-Statements)	H361 (with no letters)–Suspected of damaging fertility or the unborn child <state specific effect if known> <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>	Reproductive and/or Developmental Toxicity	Authoritative	B	M (R and/or D)	Mult	UNK
284	EU–GHS (H-Statements)	H410–Very toxic to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Authoritative	B	U	Mult	P1
285	EU–GHS (H-Statements)	H411–Toxic to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Authoritative	B	U	Mult	P1

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
286	EU–GHS (H-Statements)	H412–Harmful to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Authoritative	B	U	Mult	UNK
287	EU–GHS (H-Statements)	H413– May cause long–lasting harmful effects to aquatic life	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Authoritative	B	U	Mult	UNK
288	EU–REACH Annex XVII CMRs	Reproduction Category 3 –possible	Reproductive and/or Developmental Toxicity	Authoritative	B	M (R and/or D)	Mult	UNK
289	EU–REACH Annex XVII CMRs	Toxic to Reproduction Category 1–Substances known to impair fertility or cause Developmental Toxicity in humans	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
290	EU–REACH Annex XVII CMRs	Toxic to Reproduction Category 2–Substances which should be regarded as if they impair fertility or cause Developmental Toxicity in humans	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
291	EU–SVHC Authorisation List	PBT–Banned unless Authorised	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]	Authoritative	A	U	Mult	1
292	EU–SVHC Authorisation List	Toxic to reproduction–Banned unless Authorised	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
293	EU–SVHC Authorisation List	vPvB– Banned unless Authorised	vPvB [Persistence, Bioaccumulation]	Authoritative	A	U	Mult	1
294	EU–SVHC Candidate List	PBT–Candidate list	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]	Authoritative	A	U	Mult	1
295	EU–SVHC Candidate List	Toxic to reproduction–Candidate list	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1

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GreenScreen List Translator™ Map

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
296	EU–SVHC Candidate List	vPvB– Candidate list	vPvB [Persistence, Bioaccumulation]	Authoritative	A	U	Mult	1
297	EU–SVHC Prioritisation List	PBT–Prioritized for listing	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity]	Authoritative	A	U	Mult	1
298	EU–SVHC Prioritisation List	Toxic to reproduction–Prioritized for listing	Reproductive and/or Developmental Toxicity	Authoritative	B	H (R and/or D)	Mult	1
299	EU– SVHC Prioritisation List	vPvB–Prioritized for listing	vPvB [Persistence, Bioaccumulation]	Authoritative	A	U	Mult	1
300	German FEA–Substances Hazardous to Waters	Class 1–Low Hazard to Waters	Any combination of the following: Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects, Carcinogenicity, Reproductive Toxicity, Developmental Toxicity, Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Persistence, Bioaccumulation.	Screening	B	U	Mult	UNK
301	German FEA–Substances Hazardous to Waters	Class 2–Hazard to Waters	Any combination of the following: Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects, Carcinogenicity, Reproductive Toxicity, Developmental Toxicity, Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Persistence, Bioaccumulation.	Screening	B	U	Mult	P1
302	German FEA–Substances Hazardous to Waters	Class 3–Severe Hazard to Waters	Any combination of the following: Acute Mammalian Toxicity, Systemic Toxicity/Organ Effects, Carcinogenicity, Reproductive Toxicity, Developmental Toxicity, Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Persistence, Bioaccumulation.	Screening	B	U	Mult	P1

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
303	GHS–[COUNTRY]	Category 1	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	H (ST–repeated and/or N–repeated)	Mult	UNK
304	GHS–[COUNTRY]	Category 1	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	vH (ST–single and/or N–single)	Mult	UNK
305	GHS–[COUNTRY]	Category 1	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
306	GHS–[COUNTRY]	Category 2	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	M (ST–repeated and/or N–repeated)	Mult	UNK
307	GHS–[COUNTRY]	Category 2	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	H (ST–single and/or N–single)	Mult	UNK
308	GHS–[COUNTRY]	Category 2	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
309	GHS–[COUNTRY]	Category 3	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	M (ST–single and/or N–single)	Mult	UNK
310	GHS–[COUNTRY]	Category 3	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK
311	GHS–[COUNTRY]	Category 4	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK

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GreenScreen List Translator™ Map

TABLE A12.2: **Multiple Hazard Endpoints**

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
312	GHS–[COUNTRY]	H370–Causes damage to organs	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	vH (ST–single and/or N – single)	Mult	UNK
313	GHS–[COUNTRY]	H371–May cause damage to organs	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	H (ST–single and/or N – single)	Mult	UNK
314	GHS–[COUNTRY]	H372–Causes damage to organs through prolonged or repeated exposure	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	H (ST–repeated and/or N –repeated)	Mult	UNK
315	GHS–[COUNTRY]	H373–May cause damage to organs through prolonged or repeated exposure	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	M (ST–repeated and/or N –repeated)	Mult	UNK
316	GHS–[COUNTRY]	H410–Very toxic to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
317	GHS–[COUNTRY]	H411–Toxic to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
318	GHS–[COUNTRY]	H412–Harmful to aquatic life with long lasting effects	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK
319	GHS–[COUNTRY]	H413–May cause long–lasting harmful effects to aquatic life	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK
320	GHS–[COUNTRY]	Not Classified	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	L (ST–repeated and/or N –repeated)	Mult	UNK

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
321	GHS–[COUNTRY]	Not Classified	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	L (ST–single and/or N –single)	Mult	UNK
322	GHS– [NEW ZEALAND]	6.9A	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	L (ST–repeated and/or N –repeated)	Mult	UNK
323	GHS–[NEW ZEALAND]	6.9A	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	vH (ST–single and/or N –single)	Mult	UNK
324	GHS–[NEW ZEALAND]	6.9B	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	L (ST–repeated and/or N –repeated)	Mult	UNK
325	GHS–[NEW ZEALAND]	6.9B	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	H (ST–single and/or N –single)	Mult	UNK
326	GHS–[NEW ZEALAND]	9.1A	T & P and/or B [(Chronic Aquatic Toxicity and ersistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
327	GHS–[NEW ZEALAND]	9.1B	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	P1
328	GHS–[NEW ZEALAND]	9.1C	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK
329	GHS–[NEW ZEALAND]	9.1D	T & P and/or B [(Chronic Aquatic Toxicity and Persistence) or (Acute Aquatic Toxicity and Persistence and/or Bioaccumulation)]	Screening	B	U	Mult	UNK

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
330	GHS–[NEW ZEALAND]	Not Classified	Systemic Toxicity/ Organ Effects [Repeated Exposure] and/or Neurotoxicity [Repeated Exposure]	Screening	A	L (ST–repeated and/or N –repeated)	Mult	UNK
331	GHS–[NEW ZEALAND]	Not Classified	Systemic Toxicity/ Organ Effects [Single Exposure] and/or Neurotoxicity [Single Exposure]	Screening	A	L (ST–single and/or N –single)	Mult	UNK
332	MAK	Sensitizing Substance SP–Danger of photocontact sensitization	Skin and/or Respiratory Sensitization	Authoritative	B	H (SnS and/or SnR)	Mult	UNK
333	OR DEQ–Priority Persistent Pollutants	Priority Persistent Pollutant–Tier 1 and Tier 2 (Legacy Persistent Pollutants)	PBT [Persistence, Bioaccumulation and any of the following: Ecotox and/or Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1
334	OSPAR	Equivalent Concern–chemical for priority action	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/ Organ Effects repeated exposure)]	Authoritative	A	U	Mult	P1
335	OSPAR	Equivalent Concern–substance of possible concern	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/ Organ Effects repeated exposure)]	Screening	A	U	Mult	P1

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
336	OSPAR	PBT– chemical for priority action	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/ Organ Effects repeated exposure)]	Authoritative	A	U	Mult	1
337	OSPAR	PBT–substance of possible concern	PBT [Persistence, Bioaccumulation, and any of the following: Acute Aquatic Toxicity, Chronic Aquatic Toxicity, Carcinogenicity, Mutagenicity, Reproductive Toxicity, Developmental Toxicity, Systemic Toxicity/ Organ Effects repeated exposure)]	Screening	A	U	Mult	P1
338	Québec CSST–WHMIS 1988	Class D2A–Very toxic material causing other toxic effects and Class D2B–Toxic material causing other toxic effects	One or more of the following Chronic Human Health Effects: Carcinogenicity, Mutagenicity/Genotoxicity, Reproductive Toxicity, Developmental Toxicity, Skin Sensitization, Respiratory Sensitization, Systemic Toxicity/ Organ Effects, Eye Irritation, Skin Irritation.	Screening	B	U	Mult	UNK
339	Québec CSST–WHMIS 1988	E Corrosive	Reactivity and/or Eye Irritation/ Corrosivity and/or Skin Irritation/ Corrosivity	Screening	B	U (Rx and/ or F)	Mult	UNK
340	UNEP Stockholm Conv–Persistent Organic Pollutants	Priority POP	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]	Authoritative	A	U	Mult	1
341	US EPA–Priority PBTs (NWMP)	Priority PBT	PBT [Persistence, Bioaccumulation and any of the following: Ecotox and/or Human Toxicity (Human Health Effects)]	Authoritative	A	U	Mult	1
342	US EPA–Toxics Release Inventory PBTs	PBT	PBT [Persistence, Bioaccumulation, and Acute Aquatic Toxicity]	Authoritative	A	U	Mult	1

TABLE A12.2: **Multiple Hazard Endpoints** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
343	WA DoE – PBT	PBT	PBT [Persistence, Bioaccumulation and any of the following: Ecotoxicity and/or Human Toxicity (Human Health Effects)]	Screening	A	U	Mult	P1

SECTION V — ANNEX 12

GreenScreen List Translator™ Map

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)**

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
345	EU–GHS (H-Statements)	EU–H031–Contact with acids liberates toxic gas	Reactivity	Authoritative	B	vH or H	vH or H	UNK
346	EU–GHS (H-Statements)	EU–H032 –Contact with acids liberates very toxic gas	Reactivity	Authoritative	A	vH	vH	UNK
347	EU–GHS (H-Statements)	H200 Unstable explosive	Reactivity	Authoritative	A	vH	vH	UNK
348	EU–GHS (H-Statements)	H201–Explosive; mass explosion hazard	Reactivity	Authoritative	A	H	H	UNK
349	EU–GHS (H-Statements)	H202–Explosive, severe projection hazard	Reactivity	Authoritative	A	H	H	UNK
350	EU–GHS (H-Statements)	H203– Explosive; fire, blast or projection hazard	Reactivity	Authoritative	A	H	H	UNK
351	EU–GHS (H-Statements)	H204–Fire or projection hazard	Reactivity	Authoritative	A	M	M	UNK
352	EU–GHS (H-Statements)	H205–May mass explode in fire	Reactivity	Authoritative	A	M	M	UNK
353	EU–GHS (H-Statements)	H220–Extremely flammable gas	Flammability	Authoritative	A	vH	vH	UNK
354	EU – GHS (H-Statements)	H221–Flammable gas	Flammability	Authoritative	B	H or M	H or M	UNK
355	EU–GHS (H-Statements)	H222–Extremely flammable aerosol	Flammability	Authoritative	A	H	H	UNK
356	EU–GHS (H-Statements)	H223–Flammable aerosol	Flammability	Authoritative	A	M	M	UNK
357	EU–GHS (H-Statements)	H224–Extremely flammable liquid and vapour	Flammability	Authoritative	A	vH	vH	UNK
358	EU–GHS (H-Statements)	H225–Highly flammable liquid and vapour	Flammability	Authoritative	A	H	H	UNK
359	EU–GHS (H-Statements)	H226– Flammable liquid and vapour	Flammability	Authoritative	A	M	M	UNK
360	EU–GHS (H-Statements)	H227–Combustible liquid	Flammability	Authoritative	A	M	M	UNK
361	EU–GHS (H-Statements)	H228–Flammable solid	Flammability	Authoritative	B	H or M	H or M	UNK
362	EU–GHS (H-Statements)	H230–May react explosively even in the absence of air	Flammability	Authoritative	A	vH	vH	UNK
363	EU–GHS (H-Statements)	H231–May react explosively even in the absence of air at elevated pressure and/or temperature	Flammability	Authoritative	A	vH	vH	UNK

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
364	EU–GHS (H-Statements)	H240–Heating may cause an explosion	Reactivity	Authoritative	A	vH	vH	UNK
365	EU–GHS (H-Statements)	H241–Heating may cause a fire or explosion	Reactivity	Authoritative	A	vH	vH	UNK
366	EU–GHS (H-Statements)	H242–Heating may cause a fire	Reactivity	Authoritative	B	vH, H, or M	UNK	UNK
367	EU–GHS (H-Statements)	H250–Catches fire spontaneously if exposed to air	Flammability	Authoritative	A	H	H	UNK
368	EU–GHS (H-Statements)	H251–Self–heating: may catch fire	Reactivity	Authoritative	A	H	H	UNK
369	EU–GHS (H-Statements)	H252–Self–heating in large quantities; may catch fire	Reactivity	Authoritative	A	M	M	UNK
370	EU–GHS (H-Statements)	H260–In contact with water releases flammable gases which may ignite spontaneously	Reactivity	Authoritative	A	vH	vH	UNK
371	EU–GHS (H-Statements)	H261–In contact with water releases flammable gases	Reactivity	Authoritative	B	H or M	H or M	UNK
372	EU–GHS (H-Statements)	H270–May cause or intensify fire; oxidiser (GAS ONLY)	Reactivity	Authoritative	A	H	H	UNK
373	EU–GHS (H-Statements)	H271–May cause fire or explosion; strong oxidiser	Reactivity	Authoritative	A	vH	vH	UNK
374	EU–GHS (H-Statements)	H272–May intensify fire; oxidiser	Reactivity	Authoritative	B	H or M	H or M	UNK
375	EU–GHS (H-Statements)	H290–May be corrosive to metals	Reactivity	Authoritative	A	M	M	UNK
376	GHS–[COUNTRY]	Aerosols Category 1	Flammability	Screening	A	H	H	UNK
377	GHS–[COUNTRY]	Aerosols Category 2	Flammability	Screening	A	M	M	UNK
378	GHS–[COUNTRY]	Aerosols Category 3	Flammability	Screening	A	L	L	UNK
379	GHS–[COUNTRY]	Desensitized Explosives Category 1 or 2	Reactivity	Screening	A	H	H	UNK
380	GHS–[COUNTRY]	Desensitized Explosives Category 3 or 4	Reactivity	Screening	A	M	M	UNK
381	GHS–[COUNTRY]	Explosives GHS Division 1.1, 1.2 or 1.3	Reactivity	Screening	A	H	H	UNK
382	GHS–[COUNTRY]	Explosives GHS Division 1.4 or 1.5	Reactivity	Screening	A	M	M	UNK
383	GHS–[COUNTRY]	Explosives GHS Division 1.6	Reactivity	Screening	A	L	L	UNK

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
384	GHS–[COUNTRY]	Explosives GHS Unstable	Reactivity	Screening	A	vH	vH	UNK
385	GHS–[COUNTRY]	Flammable Gases (incl. pyrophoric gases, or chemically unstable gases) Category 1A	Flammability	Screening	A	vH	vH	UNK
386	GHS–[COUNTRY]	Flammable Gases Category 1B	Flammability	Screening	A	H	H	UNK
387	GHS–[COUNTRY]	Flammable Gases Category 2	Flammability	Screening	A	M	M	UNK
388	GHS–[COUNTRY]	Flammable Liquid Category 1	Flammability	Screening	A	vH	vH	UNK
389	GHS–[COUNTRY]	Flammable Liquid Category 2	Flammability	Screening	A	H	H	UNK
390	GHS–[COUNTRY]	Flammable Liquid Category 3 or 4	Flammability	Screening	A	M	M	UNK
391	GHS–[COUNTRY]	Flammable Solids Category 1	Flammability	Screening	A	H	H	UNK
392	GHS–[COUNTRY]	Flammable Solids Category 2	Flammability	Screening	A	M	M	UNK
393	GHS–[COUNTRY]	H200 Unstable explosive	Reactivity	Screening	A	vH	vH	UNK
394	GHS–[COUNTRY]	H201–Explosive; mass explosion hazard	Reactivity	Screening	A	H	H	UNK
395	GHS–[COUNTRY]	H202–Explosive, severe projection hazard	Reactivity	Screening	A	H	H	UNK
396	GHS–[COUNTRY]	H203–Explosive; fire, blast or projection hazard	Reactivity	Screening	A	H	H	UNK
397	GHS–[COUNTRY]	H204–Fire or projection hazard	Reactivity	Screening	A	M	M	UNK
398	GHS–[COUNTRY]	H205–May mass explode in fire	Reactivity	Screening	A	M	M	UNK
399	GHS–[COUNTRY]	H206– Fire, blast or projection hazard; increased risk of explosion if desensitizing agent is reduced	Reactivity	Screening	A	H	H	UNK
400	GHS–[COUNTRY]	H207–Fire or projection hazard; increased risk of explosion if desensitizing agent is reduced	Reactivity	Screening	B	H or M	H or M	UNK
401	GHS–[COUNTRY]	H208–Fire hazard; increased risk of explosion if desensitizing agent is reduced	Reactivity	Screening	A	M	M	UNK

SECTION V — ANNEX 12

GreenScreen List Translator™ Map

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
402	GHS–[COUNTRY]	H220–Extremely flammable gas	Flammability	Screening	A	vH	vH	UNK
403	GHS–[COUNTRY]	H221–Flammable gas	Flammability	Screening	B	H or M	H or M	UNK
404	GHS–[COUNTRY]	H222–Extremely flammable aerosol	Flammability	Screening	A	H	H	UNK
405	GHS–[COUNTRY]	H223– Flammable aerosol	Flammability	Screening	A	M	M	UNK
406	GHS–[COUNTRY]	H224– Extremely flammable liquid and vapour	Flammability	Screening	A	vH	vH	UNK
407	GHS–[COUNTRY]	H225–Highly flammable liquid and vapour	Flammability	Screening	A	H	H	UNK
408	GHS–[COUNTRY]	H226–Flammable liquid and vapour	Flammability	Screening	A	M	M	UNK
409	GHS–[COUNTRY]	H227–Combustible liquid	Flammability	Screening	A	M	M	UNK
410	GHS–[COUNTRY]	H228–Flammable solid	Flammability	Screening	B	H or M	H or M	UNK
411	GHS–[COUNTRY]	H230–May react explosively even in the absence of air	Flammability	Screening	A	vH	vH	UNK
412	GHS–[COUNTRY]	H231–May react explosively even in the absence of air at elevated pressure and/or temperature	Flammability	Screening	A	vH	vH	UNK
413	GHS–[COUNTRY]	H232–May ignite spontaneously if exposed to air	Flammability	Authoritative	A	H	H	UNK
414	GHS–[COUNTRY]	H240–Heating may cause an explosion	Reactivity	Screening	A	vH	vH	UNK
415	GHS–[COUNTRY]	H241–Heating may cause a fire or explosion	Reactivity	Screening	A	vH	vH	UNK
416	GHS–[COUNTRY]	H242–Heating may cause a fire	Reactivity	Screening	B	vH, H, or M	UNK	UNK
417	GHS–[COUNTRY]	H250–Catches fire spontaneously if exposed to air	Flammability	Screening	A	H	H	UNK
418	GHS–[COUNTRY]	H251–Self–heating: may catch fire	Reactivity	Screening	A	H	H	UNK
419	GHS–[COUNTRY]	H252–Self–heating in large quantities; may catch fire	Reactivity	Screening	A	M	M	UNK
420	GHS–[COUNTRY]	H260–In contact with water releases flammable gases which may ignite spontaneously	Reactivity	Screening	A	vH	vH	UNK

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
421	GHS–[COUNTRY]	H261 – In contact with water releases flammable gases	Reactivity	Screening	B	H or M	H or M	UNK
422	GHS–[COUNTRY]	H270 – May cause or intensify fire; oxidiser (GAS ONLY)	Reactivity	Screening	A	H	H	UNK
423	GHS–[COUNTRY]	H271 – May cause fire or explosion; strong oxidiser	Reactivity	Screening	A	vH	vH	UNK
424	GHS–[COUNTRY]	H272 – May intensify fire; oxidiser	Reactivity	Screening	B	H or M	H or M	UNK
425	GHS–[COUNTRY]	H290 – May be corrosive to metals	Reactivity	Screening	A	M	M	UNK
426	GHS–[COUNTRY]	Not Classified	Flammability	Screening	A	L	L	UNK
427	GHS–[COUNTRY]	Organic Peroxides GHS Type A or B	Reactivity	Screening	A	vH	vH	UNK
428	GHS–[COUNTRY]	Organic Peroxides GHS Type C or D	Reactivity	Screening	A	H	H	UNK
429	GHS–[COUNTRY]	Organic Peroxides GHS Type E or F	Reactivity	Screening	A	M	M	UNK
430	GHS–[COUNTRY]	Organic Peroxides GHS Type G	Reactivity	Screening	A	L	L	UNK
431	GHS–[COUNTRY]	Oxidizing Gases Category 1	Reactivity	Screening	A	H	H	UNK
432	GHS–[COUNTRY]	Oxidizing Liquids and Solids Category 1	Reactivity	Screening	A	vH	vH	UNK
433	GHS–[COUNTRY]	Oxidizing Liquids and Solids Category 2	Reactivity	Screening	A	H	H	UNK
434	GHS–[COUNTRY]	Oxidizing Liquids and Solids Category 3	Reactivity	Screening	A	M	M	UNK
435	GHS–[COUNTRY]	Pyrophoric Liquids Category 1	Flammability	Screening	A	H	H	UNK
436	GHS–[COUNTRY]	Pyrophoric Solids Category 1	Flammability	Screening	A	H	H	UNK
437	GHS–[COUNTRY]	Self–heating Substances Category 1	Reactivity	Screening	A	H	H	UNK
438	GHS–[COUNTRY]	Self–heating Substances Category 2	Reactivity	Screening	A	M	M	UNK
439	GHS–[COUNTRY]	Self–reactive Substances GHS Type A or B	Reactivity	Screening	A	vH	vH	UNK
440	GHS–[COUNTRY]	Self–reactive Substances GHS Type C or D	Reactivity	Screening	A	H	H	UNK
441	GHS–[COUNTRY]	Self–reactive Substances GHS Type E or F	Reactivity	Screening	A	M	M	UNK
442	GHS–[COUNTRY]	Self–reactive Substances GHS Type G	Reactivity	Screening	A	L	L	UNK

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
443	GHS–[COUNTRY]	Substances Corrosive to Metal Category 1	Reactivity	Screening	A	M	M	UNK
444	GHS–[COUNTRY]	Substances which on contact with water emit flammable gases Category 1	Reactivity	Screening	A	vH	vH	UNK
445	GHS–[COUNTRY]	Substances which on contact with water emit flammable gases Category 2	Reactivity	Screening	A	H	H	UNK
446	GHS–[COUNTRY]	Substances which on contact with water emit flammable gases Category 3	Reactivity	Screening	A	M	M	UNK
447	GHS–[NEW ZEALAND]	1.6	Reactivity	Screening	A	L	L	UNK
448	GHS–[NEW ZEALAND]	1.1 or 1.2 or 1.3	Reactivity	Screening	A	H	H	UNK
449	GHS–[NEW ZEALAND]	1.4 or 1.5	Reactivity	Screening	A	M	M	UNK
450	GHS–[NEW ZEALAND]	2.1.1A	Flammability	Screening	B	vH or H	vH or H	UNK
451	GHS–[NEW ZEALAND]	2.1.1B	Flammability	Screening	A	M	M	UNK
452	GHS–[NEW ZEALAND]	2.1.2A	Flammability	Screening	B	vH or H	vH or H	UNK
453	GHS–[NEW ZEALAND]	3.1A	Flammability	Screening	A	vH	vH	UNK
454	GHS–[NEW ZEALAND]	3.1B	Flammability	Screening	A	H	H	UNK
455	GHS–[NEW ZEALAND]	3.1C or 3.1D	Flammability	Screening	A	M	M	UNK
456	GHS–[NEW ZEALAND]	4.1.1A	Flammability	Screening	A	H	H	UNK
457	GHS–[NEW ZEALAND]	4.1.1B	Flammability	Screening	A	M	M	UNK
458	GHS–[NEW ZEALAND]	4.1.2A or 4.1.2B	Reactivity	Screening	A	vH	vH	UNK
459	GHS–[NEW ZEALAND]	4.1.2C or 4.1.2D	Reactivity	Screening	A	H	H	UNK
460	GHS–[NEW ZEALAND]	4.1.2E or 4.1.2F	Reactivity	Screening	A	M	M	UNK
461	GHS–[NEW ZEALAND]	4.1.2G	Reactivity	Screening	A	L	L	UNK
462	GHS–[NEW ZEALAND]	4.2A	Flammability	Screening	A	H	H	UNK
463	GHS–[NEW ZEALAND]	4.2B	Reactivity	Screening	A	H	H	UNK

TABLE A12.3: **Flammability and Reactivity (Single Hazard Endpoints)** CONTINUED

	GreenScreen Supporting List Information		GreenScreen List Translator					
ID	List	Sublist Category	GreenScreen Hazard	List Type	A or B	Hazard Range	Display in Hazard Box	List Translator Score
464	GHS–[NEW ZEALAND]	4.2C	Reactivity	Screening	A	M	M	UNK
465	GHS–[NEW ZEALAND]	4.3A	Reactivity	Screening	A	vH	vH	UNK
466	GHS–[NEW ZEALAND]	4.3B	Reactivity	Screening	A	H	H	UNK
467	GHS–[NEW ZEALAND]	4.3C	Reactivity	Screening	A	M	M	UNK
468	GHS–[NEW ZEALAND]	5.1.1A	Reactivity	Screening	A	vH	vH	UNK
469	GHS–[NEW ZEALAND]	5.1.1B	Reactivity	Screening	A	H	H	UNK
470	GHS–[NEW ZEALAND]	5.1.1C	Reactivity	Screening	A	M	M	UNK
471	GHS–[NEW ZEALAND]	5.1.2A	Reactivity	Screening	A	H	H	UNK
472	GHS–[NEW ZEALAND]	5.2A or 5.2B	Reactivity	Screening	A	vH	vH	UNK
473	GHS–[NEW ZEALAND]	5.2C or 5.2D	Reactivity	Screening	A	H	H	UNK
474	GHS–[NEW ZEALAND]	5.2E or 5.2F	Reactivity	Screening	A	M	M	UNK
475	GHS–[NEW ZEALAND]	5.2G	Reactivity	Screening	A	L	L	UNK
476	GHS–[NEW ZEALAND]	8.1A	Reactivity	Screening	A	M	M	UNK
477	Québec CSST–WHMIS 1988	Class B1–Flammable gases	Flammability	Screening	A	H	H	UNK
478	Québec CSST–WHMIS 1988	Class B2–Flammable liquids	Flammability	Screening	B	vH, H, or M	UNK	UNK
479	Québec CSST–WHMIS 1988	Class B3–Combustible liquids	Flammability	Screening	A	M	M	UNK
480	Québec CSST–WHMIS 1988	Class B4–Flammable solids	Flammability	Screening	B	H or M	H or M	UNK
481	Québec CSST–WHMIS 1988	Class B5–Flammable Aerosol	Flammability	Screening	B	H or M	H or M	UNK
482	Québec CSST–WHMIS 1988	Class B6–Reactive flammable materials	Reactivity	Screening	B	vH, H, or M	UNK	UNK
483	Québec CSST–WHMIS 1988	Class C–Oxidizing materials	Reactivity	Screening	B	vH, H, or M	UNK	UNK
484	Québec CSST–WHMIS 1988	Class F–Dangerously reactive materials	Reactivity	Screening	B	vH, H, or M	UNK	UNK

Section VI — Assessement Templates

The following assessment templates can be downloaded in the Microsoft Word format at:
https://www.greenscreenchemicals.org/method/method-documents

TEMPLATE 1
GreenScreen Chemical Assessment Report Template

TEMPLATE 2
GreenScreen Polymer Substance Assessment Report Template

TEMPLATE 3
GreenScreen Polymer Mixture Assessment Report Template

TEMPLATE 4
GreenScreen Product Assessment Report Template

GreenScreen® for Safer Chemicals

Hazard Assessment Guidance

Version 1.5a • March 2026

FOR CHEMICALS, POLYMERS, AND PRODUCTS

The intent of guidance is to provide users with clear step-by-step instructions on how to conduct GreenScreen assessments—a comprehensive review of all available information on chemical compounds, chemicalsubstances/mixtures, polymers, and a variety of product types including polymeric materials.

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